THE REFERENCE SHELF

Volume IV Number 4

ST. LAWRENCE RIVER SHIP CANAL

(Supplementary to Reference Shelf. Volume I, Number 3.)

Compiled by
JULIA E. JOHNSEN

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INTRODUCTION

The realization of a deep waterway from the Great Lakes to the ocean is a vision that has long held the minds of men. Urged orginally by far-seeing officials and a group of land-locked states, it has steadily come to attract a greater degree of national attention. Its importance was especially emphasised when the report of the International Joint Commission was forwarded to Congress by President Harding on January 16, 1922, after the completion of the investigation authorized in 1919. This report endorsed the improvement of the St. Lawrence River between Lake Ontario and Montreal for navigation and power, and proposed that the United States and Canada should enter upon a treaty to promote such improvement.

Obstacles intervened to immediate official action upon the above report but negotiations were carried on by the State Department and in 1924 official investigations were again commenced by both countries with a view to determining action upon the report of 1922. A Joint Engineering Board was appointed by the United States and Canada to review facts relevant to the engineering aspects of the subject. A St. Lawrence Commission of the United States was appointed to consider other aspects of interest to this country, while a National Advisory Committee was appointed by Canada for the independent consideration of Canada's national policy. The reports of the Joint Engineering Board and the St. Lawrence Commission of the United States are due for concurrent publication.

Parallel with the above recent investigations official recognition was given to a possible all-American deep waterway to the sea, which had come to be urged in some

quarters as a desirable alternative to a Canadian route to the sea. Congress, under the Rivers and Harbors Act approved March 3, 1925, authorized an examination and survey of a projected waterway from the Great Lakes to the Hudson River suitable for vessels of a draft of twenty or twenty-five feet. In connection with such project in which it was vitally interested the state of New York considered a proposal to cede or sell to the Federal government the State Barge Canal to be used as a component part of such development scheme. The report on the all-American waterway was made on March 29, 1926. It withheld for the time being any definite recommendation for such waterway.

The present number of the Reference Shelf supplements the Reference Shelf Volume 1, Number 3, on the same subject, which was first published in December 1922, and reprinted with additional references in March 1924. It covers material and, with a few exceptions, references appearing since that date. A revised brief is included.

October 15, 1926.

JULIA E. JOHNSEN

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NEGATIVE DISCUSSION

BRIEF

RESOLVED: *That the United States and Canada should jointly improve the St. Lawrence River between Lake Ontario and Montreal for navigation and power, in accordance with the recommendations of the International Investigating Commissions.*

AFFIRMATIVE

I. There is sufficient need of the St. Lawrence improvement as a deep sea channel to justify a project of that magnitude.

A. A widespread demand exists.

1. An outlet to the sea is urgently demanded by an important section of the country.
   a. Eighteen states with a population of forty-two million, and representing 63 per cent of the total value of farm property in the nation and a large percentage of our industrial resources.
2. It has been widely favored by public men, etc.
   a. Presidents Coolidge and Harding, Secretary Hoover and others.

B. There is economic need of the proposed waterway.

1. Freight rates are too high.
2. Freight moving to eastern ports is highly penalized by heavy charges for rehandling, storage, delays, loss from shrinkage, etc.

C. The transportation system of the country is inadequate.

1. It is subject to break down during crop moving time and peak loads.
   a. This causes great losses to fall upon producers and distributors.
2. It is inadequate to meet demands during a national crisis.
   a. It broke down during the late war.
3. It cannot keep up with the expansion of population and production.

D. Waterway transportation is important and should be developed.
1. It is more economical than rail.
2. It is preferable for certain bulk freight.
3. It helps to regulate rail rates.
4. Both rail and water facilities are needed.

E. The proposed waterway is already a widely used traffic route and only needs development to the maximum efficiency.
1. There are less than sixty miles of restricted channel to be developed.

II. The proposed St. Lawrence waterway is desirable, feasible and economically sound.

A. It would bring the seaboard to the interior.
1. Accommodate boats large enough for ocean traffic.
   a. About 80 per cent of the tonnage of the world would be able to use it.
2. Ocean vessels will make use of it.
   a. There is ample testimony to this effect.
   b. The tonnage is available.

B. It would be an economic benefit.
1. It would benefit the middle west.
   a. Increase agricultural and manufacturing production, the use of unoccupied land, etc.

b. Bring in the produce the west requires.
c. It would add to prices received for produce.

2. It would benefit the rest of the country.
   a. The entire country would share in the general prosperity.
3. It would benefit export trade.
   a. It is the shortest route to European ports.

C. It would be feasible.
1. There are no unsurmountable physical problems.
   a. Competent engineers have pronounced it practicable.
2. The cost would not be excessive.
   a. The cost would be $275,000,000 for a 30-foot channel and $1,465,000 for power.
   b. Canada would share the cost.
   c. Power would help to pay for it.
   d. The saving to the nation would offset the cost of the work.

D. There are no valid objections to it.
1. It would not injure other ports.
   a. New York, Buffalo, Montreal, etc.
      (1) They would share in the general prosperity.
2. It would not injure other routes.
   a. It would act as feeders to railroads.
   b. There is room for both.
3. The delays and dangers incident to traffic through resricted channels would be insignificant.
   a. Delays on locks would be only twelve to sixteen hours the entire way from Duluth to Montreal.

III. An all American route will not solve the problem of a waterway to the sea.
  A. The proposed Oswego-Albany-Hudson route, the most desirable American route, would not result in benefits commensurate with the expenditure.
    1. The cost would be excessive.
      a. The first cost is estimated officially at $506,000,000 for a 25-foot waterway, or $832,000,000 including interest, Erie-Ontario canal, and deepening important harbors and channels.
      b. The annual cost would exceed savings on the freight which it is estimated would move over it.
    2. The present barge canal is capable of carrying all the traffic that is offered for water transportation on this route.
    3. It would not provide the needed outlet for products of the middle west.
      a. The rate is not sufficiently low.
      b. The cost thru the port of New York is excessive.
        (1) It is congested.
        (2) Handling charges through New York are often more than the entire cost of water carriage.
  B. It would not be as practicable.
    1. It would involve longer reaches of restricted channel.
    2. Numerous fixed bridges and locks would delay movement.
    3. It would be closed by ice five months of the year.
  C. It does not include power development.

D. Military advantages do not sufficiently affect the case.
   1. The possibility of war is too remote to consider.
   2. The Canadian border has been unfortified for over a century.
   3. There is no reason to assume interference with shipping in case of our war with any other country.

NEGATIVE

I. A reasonable need of the St. Lawrence waterway is not shown.
   A. The commercial needs of the country can be otherwise met.
      1. Railroads can generally care for all traffic.
         a. They are generally preferred except on certain bulk commodities.
         b. They are capable of increasing facilities where traffic warrants.
         c. Conditions during the war were unusual.
      2. An all-American route can meet every need.
         a. It would provide a route to the sea.
         b. It would give the middle west the relief it demands.
            (1) Solve the transportation problem.
            (2) Provide cheaper water rates.
         c. It would make seaports of lake cities.
            (1) It is not essential for ocean vessels to enter lakes at all, for success of a ship canal.
               (a) It is necessary only to provide a junction point at

which ocean and lake tonnage can be exchanged.

B. The probable benefits are exaggerated.
   1. The probable freight saving has been overestimated.
   2. It is not justified by probable traffic.
      a. Existing trade would not be diverted to the new channel to the extent expected.
      b. It is doubtful if new trade will increase to the extent expected.
      c. Grain exports are declining and will soon practically cease.
      d. No adequate return cargoes to the west are available.
   3. It would not be available for use for many years.

C. Ocean vessels will not use it to the extent expected.
   1. It will take too long for them to visit inland ports.
      a. The slow time will interfere markedly with profits.
   2. The lake type of steamer can handle traffic cheaper.
      a. It is much more costly to build and operate the ocean-going type of vessel.
   3. The lakes harbors will not admit of ocean going vessels.

D. The demand is largely sectional.

II. The St. Lawrence route would be undesirable, unfeasible, and unsound.

A. The proposed route is undesirable.
   1. There are difficult engineering problems to contend with.

2. It would be navigable only six or seven months of the year.
3. Fog and ice are prevalent.
4. Insurance rates are high.
5. It would traverse two countries with ocean entrance in Canada.

B. It would be injurious to our country and to invested capital.
   1. Take business away from American ports
   2. Injure harbor and elevator interests.
   3. Injure railroad service and lake craft.
   4. Delay other national projects.

C. International partnership would be undesirable.
   1. Canada would benefit at our expense.
      a. Montreal would be the chief port benefitted.
      b. Her resources would be developed and compete with ours.
      c. She would import goods from abroad rather than from us.
   2. There would be possible complications from foreign control.
      a. It would be subject to British or Canadian control.
      b. In time of war it would be a menace.

D. The cost would be enormous.
   1. It would be more expensive than has been estimated.
      a. According to unofficial estimates it would cost from $300,000,000 to $1,500,000,000.
      b. It would be necessary to include harbor development, etc.
   2. It is doubtful if power can be used to meet cost.
      a. The power rights properly belong to

the state of New York and the province of Ontario.

E. The Panama and Suez canals are not valid arguments for the St. Lawrence development.
   1. They connect large bodies of water thousands of miles across.
   2. They are open to the greatest ships of the world all the year round.

F. The project should be given further study before being entered upon.

III. An all-American canal is a more desirable project.

A. We already have a canal whose use should be extended to maximum of efficiency.
   1. It was built at a cost of $175,000,000.
   2. It has capacity enough to transport all water borne traffic from the lakes to the ocean.
   3. It has had the approval of engineers.

B. It is a better route to the sea.
   1. It is shorter sailing distance.
      a. To the sea.
         (1) The total distance from Lake Ontario to the ocean, via Oswego, Albany, and the Hudson River, is three hundred and forty miles.
         (2) From Montreal to the ocean alone is one thousand miles.
      b. To the consuming and producing area centering about New York, to the other United States coastal ports, and to Central America, South America, and the Orient.
   2. It will in all probability carry more freight than any other inland waterway.

a. It follows a long established line of traffic.
b. It serves a more thickly settled area providing greater manufactured and other products.
c. The further growth of the region will further increase traffic and savings.

3. Climatic conditions are better.
   a. Fogs are rare on the Hudson.
   b. New York harbor is free from the menace of icebergs.
4. It would preserve the supremacy of American ports.

C. It would be an important asset in national defense in time of war.

D. The proposed canal could properly be made a Federal undertaking.
1. The major part of its business would be interstate.
2. A Federal undertaking of this nature would establish no new policy.
   a. The Maryland and Delaware canal was taken over by the Federal government.

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GENERAL DISCUSSION

FUTURE OF AMERICAN WATERWAYS[1]

During the last ten years highway transportation of freight has shown a notable increase, and waterway transportation also has given definite signs of revival. Provision for its rapid expansion during the next ten years, in the opinion of Secretary of Commerce Hoover, is a matter of "supreme national importance."

High rail rates, low ocean rates and the opening of the Panama Canal have created a "new economic situation," in which waterway development must be viewed in a new light, Secretary Hoover testified before the House Rivers and Harbors Committee when it began consideration of the 1926 river and harbor bill. These factors have combined to dislocate the economic relationships which existed between various sections of the country before the war, and have worked particularly to the disadvantage of the middle western agriculture.

Low ocean rates through the Panama Canal have drawn the Atlantic and Pacific seaboard states closer together and have stimulated industrial development in these areas, while retarding development in the territory between the Allegheny and the Rocky Mountains. Middle western agriculture meanwhile has suffered from high transportation charges to the principal domestic markets and foreign producers have enjoyed an advantage in low ocean rates to the principal export markets.

The remedy proposed by Secretary Hoover for this general situation is a rapid linking together of existing

[1] From article by Richard Boeckel. *Editorial Research Reports.* p. 119-37. February 13, 1926.

waterway facilities into "great consolidated systems" to afford the cheapest possible access to foreign and domestic markets for middle western products.

Disconnected and individual improvements to the Missisippi River and its tributaries during the last half century have created a vast waterway system which, according to Secretary Hoover, is two-thirds complete from a physical standpoint, but only 15 per cent complete from a commercial standpoint, due to the existing obstructions to the operation of modern barges.

The Great Lakes provide depths suitable for ocean vessels, but outward traffic to the sea must pass through double handling and transportation by less economically operated craft through the 12-foot New York State Barge Canal or the 14-foot St. Lawrence Canal. Every Great Lakes port could be made an ocean port, Secretary Hoover testified before the Rivers and Harbors Committee, through the construction of a 25-foot canal, either through the state of New York to the Hudson River, or along the route of the present St. Lawrence Canal. He said:

> As transportation systems, the Mississippi and Great Lakes systems might be compared with a great railroad system which has occasional stretches of narrow guage track. In such a case the volume of goods that could be handled would diminish to the capacity of the weakest link and the cost of transportation would be enormously enhanced. This is the case of these waterways systems and to my mind is one of the principal reasons why the waterways have not made a better showing in the volume of goods transported.

The decline in the proportion of the nation's commerce carried by the waterways continued down to 1915, but in the following year the first signs of a revival appeared. Railroad congestion resulting from the increase in the industrial output brought about by European war contracts, caused shippers to turn to the waterways for the movement of bulky commodities.

Soon after the United States entered the war transportation became an acute factor. The situation required

the movement of great quantities of material and personnel, all in one direction, all into the congested area and all at the same time. Railroad facilities were unable to bear the burden, and the government finally was compelled to take over the railroads and pool national transportation into one system for the diversion of traffic over the lines of least resistance.

The Great Lakes system became a vital link in the movement of iron ore, copper, wheat and other basic supplies. This system transported approximately one hundred and twenty-five million tons of freight, for which outlet to the Atlantic coast was afforded by the New York Barge Canal and the St. Lawrence Canal. The Monongahela River, which was one of the few waterways efficiently operated at the outbreak of the war, carried approximately twenty-five million tons of freight annually.

In order to realize the maximum benefit from inland waterways, the Railroad Administration was compelled to undertake the construction of floating equipment. Meanwhile, such boats as were available were chartered and river and canal operations were undertaken by the government on routes requiring the relief of rail congestion. In 1918 and 1919, the government fleet transported approximately two hundred and thirty-five thousand tons of cargo on the Mississippi and Warrior Rivers.

Soon after the armistice most of the government's waterway operations, with the exception of the Mississippi and Warrior river barge lines, were given up. By the Transportation Act of 1920 the remaining lines were transferred to the jurisdiction of the War Department.

In the Transportation Act Congress made the following statement of future policy with regard to water transportation:

> It is hereby declared to be the policy of Congress to promote, encourage and develop water transportation, service and facilities in connection with the commerce of the United States, and to foster and preserve in full vigor both rail and waterway transportation.

Federal expenditures on the Great Lakes, and the large expenditures of the states and the Canadian government upon connecting channels, have made these bodies the greatest inland transportation system in the world. The depths of the harbors and connecting channels of the Great Lakes are suitable for vessels drawing up to twenty-one feet. The St. Mary's Falls Canal, connecting Lake Superior with Lake Huron, will accommodate vessels drawing up to twenty-four and a half feet and the Sault Canal on the Canadian side vessels drawing up to twenty-two feet. The Welland Canal, connecting Lake Erie with Lake Ontario, is being deepened to twenty-five feet. This improvement will be completed by 1929. It is planned ultimately to give the Welland Canal a depth of thirty feet at extreme low water. The Canadian government has spent about $50,000,000 on this canal to date and its ultimate expenditure is estimated at $100,000,000.

The ton mileage on the Great Lakes is approximately 23 per cent of that carried on all American railroads. Transportation on the lakes has been developed to an efficiency that leads the world for bulk carriers of grain and ore. Notwithstanding the handicap of a closed season of four and a half months, freight charges have been reduced to as low as 1 mill per ton mile. It is estimated that the savings in freight charges through past improvements exceeds $130,000,000 annually.

The number of tons and the value of the cargoes carried on the Great Lakes during the period 1920-1924, as reported by the chief of engineers, are shown in the following table.

Year	Tons	Value
1920	111,139,686	$1,376,111,607
1921	71,460,170	957,770,428
1922	94,038,090	1,289,419,236
1923	125,517,551	1,383,903,308
1924	109,831,279	1,968,533,514

The New York State Barge Canal, one of the most extensive and best equipped artificial water routes in the

country, provides access to the sea for lake cargoes, via the Hudson River. An alternate route is provided by the lateral canals of the St. Lawrence, skirting three groups of rapids between Lake Ontario and Montreal. Neither of these waterways, however, will accommodate vessels of ocean size, so that foreign cargoes must pass through double handling, which is said frequently to exceed the whole cost of transportation.

The general arguments for enlarged inland waterway facilities are well summed up in the following statement of principles given in the annual report of Brigadier-General T. Q. Ashburn, chairman of the Inland Waterways Corporation, which operates the Mississippi and Warrior River barge lines under the War Department.

a. Transportation facilities, highway and rail, are insufficient to furnish the prompt and economic transportation necessary for interior development.

b. Water borne commerce is cheaper, is dependable, and more desirable for certain commodities than either rail or highway transportation.

c. That as the people as a whole have been taxed for the development of waterways on the theory that it will give them economical and necessary transportation, they are entitled to the benefits of cheaper water transportation, as far as practicable and regardless of their location, whether on the bank of the navigable stream of not.

One of the leading arguments for expansion of inland waterway facilities has been that the railroads will be incapable in the future of meeting the increased demand for transportation brought about by the growth in population and in the country's commerce. Secretary Hoover in his testimony before the Rivers and Harbors Committee said the ton mileage of the railroads had nearly trebled during the last twenty-five years, and that during the next quarter of a century transportation facilities must be expanded to handle at least double the tonnage of today. He said:

Our present railways will obviously be inadequate to meet that task. If we would provide for the 40,000,000 of increased population that this quarter of a century will bring us, we must

either build more trunk lines of railways in the states which can be served by these water systems or we must improve our waterways to take part of the burden.

This argument is not new. As early as 1872, when the Senate appointed the Windom Select Committee to investigate the subject of transportation routes to the seaboard, it was stated that the production of the country had increased much more rapidly than the means of transportation, and that the growth in population and products would demand additional and cheaper facilities to reach tidewater in the future.

The report of the Windom Committee is interesting in connection with General Ashburn's second point. It states that:

> The uniform testimony deduced from practical results in this country and throughout the commercial world is that water routes, when properly located not only afford the cheapest and best known means of transportation for all heavy, bulky and cheap commodities, but that they are also the natural competitors and most effective regulators of railway transportation.

President Roosevelt in his letter of March 14, 1907 creating the Inland Waterways Commission, after a period of railway congestion in 1906, gave the following as one of the reasons for his action:

> It is common knowledge that the railroads of the United States are no longer able to move crops and manufactures rapidly enough to secure the prompt transaction of the business of the nation, and there is small prospect of immediate relief. . . . There is reason to doubt whether any development of the railroads possible in the near future will suffice to keep transportation abreast of production. There appears to be but one complete remedy—the development of a complementary system of transportation by water.

Secretary Hoover stated in his testimony before the Rivers and Harbors Committee that to increase railway facilities to the extent required during the next twenty-five years would cost three times as much as to meet the increased transportation demands with waterways. The Inland Waterways Commission reached a similar conclusion in 1908.

The reasons waterway transportation in general is cheaper than rail may be summarized as follows:

1. Railways have the great expense of purchasing and maintaining rights of way, whereas in the case of waterways this is furnished and maintained without cost to the operator.

2. The maintenance of right of way and rolling stock of railways requires the expenditure of 28 to 34 per cent of their total revenue, whereas the maintenance of floating equipment requires an annual expenditure of less than 5 per cent.

3. One barge or boat can carry as much freight as many railway cars. Fewer vehicles reduce maintenance cost, storage arrangements and congestion of traffic.

4. Waterways are normally of "multiple trackage" while railways are generally double or single track. The waterway, therefore, avoids the expensive complication and delay due to the necessity of coordinating streams of traffic.

The average rail rate throughout the United States in 1923 was 11.09 mills per ton mile. In 1924 it was 11.21 mills per ton mile and during the first nine months of 1925 it was 10.99 mills. During these three years the Federal barge line on the Mississippi earned a profit carrying freight at 3.5 mills per ton mile and is estimated to have saved $10,000,000 to shippers. Carrying charges on the Great Lakes average 1.14 mills per ton mile.

Secretary Hoover, before the Rivers and Harbors Committee, submitted the following estimates of the cost of transporting a thousand bushels of wheat one thousand miles:

On the Great Lakes	$ 20 to $ 30
On Mississippi barges	$ 60 to $ 70
On railways	$150 to $200

He said:

These estimates are not based upon hypothetical calculations but on the actual going freight rates.

The fear that extensive waterway development will injure the railway systems is answered by its advocates with the quotation "new transportation creates new business." The attitude heretofore held by the railways toward the waterways, it is asserted, has been short-sighted and has opposed their own best interests.

Where factories are located on a waterway, it is pointed out, the competing railway may lose some traffic in the transportation of raw materials, but it gains a more important and better paying traffic by distributing the finished article. As examples of prosperity of parallel rail and water routes, the Monongahela River and the Great Lakes system are cited. The Monongahela carries approximately twenty-five million tons of freight annually, yet the traffic of the Pennsylvania Railroad which parallels the river has enormously increased. The prosperity of the country bordering the Great Lakes and the prosperity of its railroads is attributed in great measure to the cheap transportation afforded by this important waterway system.

Waterways, it is asserted, can help the railways by reducing peak loads, by balancing rail hauls, by taking the burden of low grade traffic, and by preventing car shortages. The railways can help the waterways by extending their commerce, for without rail connections, water routes can carry on local commerce only.

The vast majority of all waterborne commerce, it is pointed out, either originates on a railroad line or is delivered to a railroad to be carried to its destination. An average of 65 per cent of the total tonnage on the Federal barge line on the Mississippi since its inauguration has been carried in conjunction with rail lines, and exclusive of grain, 95 per cent of the traffic has come from or gone to the railroads for part way transportation.

The project for connecting the Great Lakes with the Atlantic by a canal of sufficient depth to permit the passage of ocean going vessels has existed in the minds of

engineers for more than one hundred years, but it is only during the last five years that it has been made the subject of practical investigation.

In 1922, on the basis of a preliminary report by the International Joint Commission, national commissions were created by both the United States and Canada for a full consideration of the project, and an appropriation of $275,000 for a new investigation of its engineering aspects was made by the last Congress.

The International Joint Commission's report that a 25-foot channel, following in general the route of the present St. Lawrence Canal, could be provided for an expenditure of $93,000,000 in the Canadian section and $159,000,000 in the international section, a total of $252,000,000. A 30-foot channel could be provided by the additional expenditure of $17,000,000. The cost of maintaining the improvement was estimated at $2,562,000 annually.

The St. Lawrence project would include the installation of hydro-electric works capable of generating some four million horsepower of electric energy, of which one-fourth would be developed in the international section. At $15 per horse power, the total energy developed would yield $60,000,000 annually, and the availability of cheap power would stimulate industrial development in the lake region, which in turn would vastly increase the commerce on the lakes.

The saving in charges for the movement of grain, through the elimination of double handling, is estimated by Secretary Hoover at 5 to 10 cents a bushel. Some three million six hundred and sixty-four thousand bushels of American and four hundred and forty million bushels of Canadian grain are moved on the Great Lakes annually. Assuming a saving of a little over 5 cents a bushel upon the entire volume, the total savings in one year would approximate the full cost of the St. Lawrence project.

The principal opposition to the St. Lawrence project centers in the state and city of New York, where an alternative "all-American" route, utilizing the New York barge canal and the Hudson River, which has already been given a depth of twenty-seven feet from New York to Albany, is advocated. In Canada there is some advocacy of an "all-Canadian" route connecting the lakes with Hudson Bay. An engineering study of the New York route was made during the closing years of the last century, and a report was submitted to Congress in 1900, but no action was taken at that time. During the last Congress an appropriation was made for a new study of the New York project, and a study of the economic advantages of both routes from the lakes to the sea has been undertaken by the Department of Commerce.

Whereas the President in previous messages had advocated the St. Lawrence route alone, in his last message he mentioned both routes, and Secretary Hoover in recent statements has shown no preference for one as against the other. In an earlier statement, however, he condemned the attitude of New York city toward the St. Lawrence project, and compared it to the opposition to labor saving devices. If the production of grain for export in the northwest were not stimulated by reductions in the cost of getting the grain to market, he said, the export trades would cease to exist and New York would cease to be a grain port in ten years.

Advocates of the St. Lawrence route point out that the New York route would be five hundred miles longer to Europe than the route via Montreal. On the other hand it is emphasized that the New York route would be some two thousand miles shorter to the principal American markets in the east and to the markets to be reached through the Panama Canal.

The only available estimate of the cost of the New York route is that of a New York congressman who said the barge canal could be deepened to thirty feet and some

one and a half million horsepower of electrical energy could be developed for a total expenditure of $500,000,000.

The three principal benefits claimed by Secretary Hoover in his various speeches and statements for the proposed Mississippi and Great Lakes developments may be summarized as follows:

1. Materially reduced costs for transporting the products of middle western agriculture and industry to the principal domestic and foreign markets.

2. Relief of congestion in the seaboard states and better distribution of population and industry through an equalization of the advantages afforded by the Panama Canal.

3. Expansion of facilities to meet an increasing demand for transportation which otherwise would require a doubling of present railroad facilities within the next twenty-five years.

Because of the advance in engineering knowledge, Secretary Hoover told the Rivers and Harbors Committee, "we can proceed with a certainty of step which has not hitherto been possible." The pioneering stage of experiment in the construction of waterways has been passed, and the ability to construct deep channels for large vessels has been proved. New methods and labor saving devices have greatly reduced the cost of constructing dams and canals. There has been a coordinate improvement in water craft, together with improvements in loading and discharging devices, which should progressively reduce the cost of water transportation. Secretary Hoover said:

> If we were to make a survey of the many problems of progress that lie before us, the development of the whole of our internal waterways would stand at the forefront. . . A survey of the forces with which we have to deal today will assure us that if we guide our national politics rightly this decade will mark a rebirth of our inland waterways.

ST. LAWRENCE DEEP WATERWAY[1]

Before the war Canada commenced, and has since its conclusion continued, the construction of a new canal between Lakes Erie and Ontario; this will, when completed, pass vessels of a draught of twenty-five feet and is so constructed as to permit of its being further deepened by dredging only. When this canal is opened, the depths of water limiting traffic between Lake Superior and the sea will be those in the St. Lawrence canals.

The reconstruction of these has been long discussed, but during the war public attention in the United States was for the first time concentrated upon it. The great iron and steel industries of the central states, the motor-car manufacturers in Detroit and elsewhere, and the vast packing and food-exporting enterprises of Chicago, found themselves hampered by the inadequacy of the railways and the congestion of Atlantic ports. A Great Lakes Tidewater Association was formed and an intense agitation for the improvement of the St. Lawrence was set on foot. This gained in strength during the boom after the war, which found the railways more helpless than ever. It extended to the western states where the grain farmers wanted relief from high freight rates, and obtained support from users of electric power in New York and New England, although this was counter-balanced by opposition from the ports of Boston, New York, Philadelphia and Baltimore. Ontario's demand for more hydro-electric power, the aspirations of the navigation and ship-building interests in Toronto and elsewhere and, in the west, a very mild enthusiasm diverted from the Hudson Bay railway project, provided Canadian backing for the pressure from the United States. In 1920 the question was referred to the International Joint Commission, a permanent body composed by three Canadian and three American members, to which, under the Waterways

[1] From *Round Table.* 14:578-84. June, 1924.

Treaty of 1909, any subject of joint interest to the two countries may be referred by agreement between them. At the same time there was formed a special joint engineering board composed of one Canadian and one United States engineer, and this board made detailed studies of the river while the International Joint Commission was holding protracted hearings throughout Canada and the United States.

In 1921 the engineers reported to the governments and submitted to the commission their recommendations for the construction of new 25-foot canals round the two lower series of rapids, which lie wholly in Canada, and for the damming of the river itself to flood out the upper series, which occur where the river forms the international boundary. They estimated the cost of the works at $252,000,000, including the development at the dams of one and a half million electrical horse power, of which Canada and the United States would each be entitled to one-half. After alternative plans had been submitted to it by interested parties, the commission unanimously recommended the negotiation of a treaty for the improvement of the river and gave general approval of the scheme submitted by the government engineers, but suggested that before any work was undertaken the plans should be further considered by an enlarged joint engineering board. It did not discuss the mode in which the capital expense should be met, but proposed that the annual charges for the navigation works should be borne by the two countries in proportion to the export and import traffic of each through the waterway, that each should develop separately its own share of the electric power, and that the jurisdiction of an international administrative body should be limited to those works on the international section of the river which could obviously not be entrusted to the sole administration of either country.

The United States quickly pressed for further action,

but Mr. Mackenzie King's government had been too short a time in power to be ready to make so important a departure, and proposed a delay. The subject was again brought forward by the United States last November and the enlargement of the engineering board has since been agreed upon. When the Canadian government stated its intention to constitute a committee to consider the general aspects of the proposal, the United States indicated that it would appoint a like committee and suggested that the two committees should hold joint meetings to settle these terms of reference; but Canada refused to concur in this proposal, saying in effect that to give international functions to the committee it intended to appoint would be inconsistent with its purpose, which was to consider whether the project was one in which Canada should join. The United States has since appointed a committee, with Mr. Hoover at its head, to forward the negotiation of a treaty. The only Canadian committee so far set up is an interdepartmental one, but the constitution of a more broadly based committee has been foreshadowed.

The project, as sketched by its supporters, strikes the imagination. Already ocean vessels penetrate farther up the St. Lawrence than any other river in the world except the Amazon. A vessel ascending to Duluth through twenty-three hundred miles of inland navigation (of which nine hundred miles is through the lakes) would be twelve hundred miles from Montreal and about the same distance by land from the nearest port on the open ocean. The waterway would, it is said, almost double the number of North American ocean ports and would bring the shipping of the high seas to the quays of many cities already great: Toronto (population, 550,000); Buffalo (525,000); Cleveland (800,000); Toledo (250,000); Detroit (1,000,000); Milwaukee (500,000); and Chicago (3,000,000), not to speak of Fort William, Port Arthur, Duluth and many other shipping points not

without importance, but of smaller population. In an elaborate report prepared at the instance of the Great Lakes Tidewater Association, and highly praised by the International Joint Commission for its completeness and accuracy, it is said that forty-one million of the inhabitants of the United States would be beneficially affected by the reduced expense of shipment through the waterway to and from north European ports, and nearly thirty million by the reduction in freight rates to and from ports in South America. A substantial water-borne traffic between lake ports and ocean ports in North America is also anticipated in the report, and it is estimated that, within five years from the completion of the waterway, the export and import traffic to and from United States ports upon it would amount to twenty million tons a year, or almost as much as now passes through either the Suez or the Panama Canal. No computations have been made of corresponding Canadian traffic, but if Mr. Hoover's very optimistic estimate that there would be a saving of 10 cents a bushel on export grain from the head of the lakes is even approximately possible, the Canadian traffic in grain alone would make a very substantial addition to the prospective tonnage. It is claimed that the saving in freight charges would alone more than justify the expenditure involved, and, moreover, that the power developed could readily be sold at a price sufficient to cover the annual charges on all the works on the river, even without the imposition of tolls.

On the other hand, opponents of the project ridicule the idea that any such returns are even remotely realizable. They emphasize the failure of the existing canal system to attract even those ocean-going vessels capable of using it, and deny that its being further deepened would increase its attractiveness. They contend that additional grain traffic, which they incline to regard as alone of much importance, would not be diverted to the new route, and point out that, since before 1915 the rate on

grain from Fort William to Montreal was little more than 6 cents a bushel and sometimes less, a saving even of 5 cents a bushel is a wild dream. They doubt the advisability of a partnership with the United States either in the waterway or in the development of power, claiming that Canada has no market for more than half of her share of the power and that its development will merely stimulate United States industries. They point to the claim of the state of New York and the province of Ontario that they and not the Federal governments are entitled to the power capable of development on the St. Lawrence, and argue against the possibility of the latter's being permitted to appropriate the proceeds of its sale to meet the cost of improvements in navigation. Montreal also has its special ground of objection: it prefers to remain at the head of navigation, and dislikes the prospect of becoming a way port even if the traffic passing through it is enormously increased.

Apart from a certain jealousy of the United States which has appeared more than once in Canadian political history, opposition to the project in Canada derives some of its force from the unfortunate experiences of the country in relation to the construction of railways, since these, undertaken in an optimistic spirit, have imposed upon the revenue a heavy burden, proximate relief from which is rather hoped for than expected. It is, therefore, not surprising to find in the United States a warm approval of the project and a keen desire that the negotiations should move rapidly forward, while the general attitude in Canada is comparatively cold and hesitating.

There is, moreover, a connected problem upon which there is in Canada but one opinion, which has been represented strongly to the United States. In 1901 the Chicago Sanitary District applied to the United States government for leave to divert water from the south end of Lake Michigan into the Mississippi basin, and obtained a permit (said to be of doubtful validity and only temporary

in duration) to divert some four thousand cubic second feet. A greater amount was, however, diverted—only partly, it is said—for the purpose of dealing with the sewage of Chicago, and really in part for the development of hydro-electric power. The diversion has been increased until it is now said to amount to from eight thousand to ten thousand cubic second feet, and it has had serious effects upon the water levels of Lake Michigan and the lower lakes, as well as of the St. Lawrence river. The right of the Sanitary District to make the diversion is now before the Supreme Court of the United States in an action for an injunction brought by the Federal government. Several of the states bordering upon the lakes are exhibiting the keenest interest, but bills have recently been introduced into Congress to give statutory authority for a diversion up to ten thousand cubic second feet. This proposal has been the subject of protests by Canada. Here the diversion is looked upon as illegal, and its continuance further chills the Canadian attitude toward the project of improving a waterway adversely affected by it.

THE ST. LAWRENCE-GREAT LAKES DEEP WATERWAY[1]

The movement for the deepening of the St. Lawrence dates back to the Cleveland meeting of the International Deep Waterways Association of September, 1895, which was followed in 1897 by the appointment of a Deep Waterways Commission. The most comprehensive and thorough investigation that has up to the present been undertaken was carried out by the International Joint Commission, consisting of three members from Canada and three from the United States. The question was referred to it for report on January 21, 1920, by agreement between the two governments concerned, and under provision of Article IX of the Boundary Treaty of 1909.

[1] By R. E. Freeman. *Nineteenth Century.* 97:815-22. June, 1925.

This body has reported itself in favor of the plan which is supported also by the Great Lakes-St. Lawrence Tidewater Association formed in the United States and by the Canadian Deep Waterways and Power Association organized in the dominion.

The two chief obstacles which prevent ocean ships from making a continuous voyage from the Atlantic to Lake Superior are the Niagara Falls and the rapids of the St. Lawrence. The former will be overcome by the new Welland Canal which, when completed, will be able to accommodate any ship afloat. This enormous undertaking, upon which the Canadian government has already spent more than $50,000,000, is to be regarded as an integral part of the lakes-to-the-ocean project. With seven gigantic locks carved out of solid stone this canal will be able to lift the largest vessels three hundred and sixty-six feet and carry them a distance of twenty-five miles. The time required to do this will be about eight hours. The Joint Commission has recommended that the cost of the Welland Canal be included in the international scheme, but nothing definite has been settled with regard to this point.

The chief source of controversy and discussion is the means to be adopted of surmounting the obstacles to deep-sea ships presented by the rapids of the mighty St. Lawrence. If these hindrances to navigation are not removed, the Welland Canal when completed will only serve as a feeder to American commerce going by way of Buffalo to the sea. At present the river is navigable for sea ships as far as Montreal; but above this city the water route is broken by three groups of rapids lying between Lake St. Louis and Lake St. Francis. The total length of the rapids is forty-three miles, with a drop of two hundred and twenty feet. Thus the whole problem is fairly well concentrated in one small section of the stream.

The existing canals, which have been in operation for

many years, are entirely inadequate for the traffic of modern sea-going vessels. In 1875, when the Canadian government ordered these old canals to be deepened to accommodate ships drawing fourteen feet of water, a reconstruction was undertaken without regard to the other dimensions of the locks. These were found to be too short. The Joint Commission, therefore, recommended that the governments of Canada and the United States should enter into a treaty arrangement for the total reconstruction of the canals to make the river navigable for large ships all the way from Montreal to Lake Ontario. The plan consists of the building of canals with a depth at low water of twenty-five feet, equipped with locks of sufficient size to enable sea-going vessels to pass.

The Engineering Board divides the project into two principal sections—the international from Lake Ontario to Cornwall, the national, or Canadian, from Cornwall to Montreal. For the former it suggests a composite plan of navigation and power development; for the latter a navigation scheme only, with the possibility of hydro-electric installations in the future. On the international section between Cornwall and Long Sault Rapids a canal is to be constructed on the Canadian side, equipped with two lift locks eight hundred and sixty feet long and eighty feet wide, having lifts of forty-eight and thirty-one feet. To restrict the number of locks and curtail the mileage of restricted navigation it is proposed to construct dams across the canals. The main dam between the islands of Barnard and Long Sault and a smaller one from the head of the latter to the American shore are expected to render possible the development of a million and a half horse-power of electrical energy. Another dam is suggested on the United States side at Ogden Island. The estimated cost of all the undertakings in the international section is somewhere in the neighborhood of $159,000,000.

In the Canadian section the Engineering Board ad-

vises the construction of a channel two hundred and twenty feet wide provided with two pairs of locks. This is to replace the present Soulanges Canal, which offsets the rapids of Coteau, the Cedars and the Cascades. To overcome the difficulties presented by the Lachine and Normond rapids it is proposed to build a new waterway following the course of the existing Lachine Canal, except that the former would run along the southerly and westerly outskirts of Montreal. This natural section of the river drops about one hundred and thirty-four feet. All the undertakings in connection with this part of the project, including the dredging of Lake St. Francis and Lake St. Louis and the construction of certain protective works in the harbor of Montreal, would call for an expenditure of $93,000,000. This brings the total cost to over $252,000,000, inclusive of all expenses for the installation of turbines and other apparatus for the generation of electric power. Should the depth of the canals be increased from twenty-five to thirty feet an extra outlay of $17,000,000 would be required. It is estimated that the annual charges for maintenance and operation would not exceed $2,562,000.

The possibility of great power development is regarded as of paramount importance, especially by eastern Ontario and the neighboring states to the south. Engineers report that, should it be deemed advisable to develop power from the Canadian section as well as from the international, two million two hundred and sixty thousand additional horsepower could be generated for an outlay of about $220,000,000. Mr. W. M. German, of Welland, in the Dominion House of Commons estimated the total possible revenue from the sale of power at $17,587,000 per year; the annual expense of the power undertakings would amount to $15,970,000 (including interest charges, maintenance and sinking fund), leaving a profit of $1,608,000. The absence of coal deposits in Ontario and the crying need for electric power in New York state and

New England would make it possible to market any amount of electricity that could be generated.

It is interesting to observe the different attitudes adopted toward the project by the various sections of the country affected. The fourteen states of the union tributary to the Great Lakes are most enthusiastic in favor of the plan. This great middle western region has about one-third of the republic's area and population, the greater part of the mineral output, and about 40 per cent of the manufacturing capital.

> Sea hunger has gripped the West. It will hack its way through to the Atlantic, or know the reason why. There is something primal about the impulse. When it grips a man or a nation it has the force of an instinct.

But perhaps the solid economic advantages have more real weight than any unreasoning "sea hunger." It is claimed that the freight rate on grain shipped from the west would be reduced by at least 5 cents a bushel; the expensive transfers necessary under present conditions would be eliminated; the congestion which now arises at certain points on the railways would be avoided. It has also been pointed out that the shipment of grain by way of the St. Lawrence would remove the delays which now occur on account of waiting for ocean space, and that grain shrinkage resulting from constant handling and transhipping would be diminished. The prospect of increased profit to grain growers, the facilities promised for the transport of vast mineral resources, and the attractive possibility of the American lake ports becoming available to ocean vessels are substantial benefits more persuasive than any blind impulse to reach the Atlantic. Moreover, it is apparent that if imported goods could be carried by ocean vessels right into the heart of the continent without transhipment there would be a large saving to buyers throughout the western area.

The city of Chicago may be called the leader in this

agitation for a deeper St. Lawrence. A newspaper in this city declared that if Canada refused to support the project an alternative American plan would be carried out: a waterway would be built joining the Great Lakes with the Hudson River by way of Oswego. Though this proposal may be mere bluff, it indicates the keenness which exists in the lake cities for an outlet to the sea. Toronto, Duluth, Milwaukee, Detroit, Hamilton and Toledo have all declared their willingness to do their part in preparing harbor facilities for ocean-going vessels.

But this attitude of approval is not universal throughout the United States. The city and state of New York are afraid that the money invested in the New York Barge Canal will be wasted and that the St. Lawrence will divert a large volume of traffic from their great port. All kinds of reasons for abandoning the undertaking have been advanced from this part of the country. Boston and Buffalo have also issued protests against the proposed waterway. The matter, of course, is disturbed by the prospect of losing the advantage accruing to her from the considerable traffic that now finds an outlet to the sea by way of the Erie Canal. The Pacific states are apprehensive lest the St. Lawrence route should divert western traffic from the Panama Canal; while in the southern part of the country there is some fear that the new waterway will compete with the Mississippi route to New Orleans.

The attitude of the United States as a whole, however, has been favorable to the project. In September, 1923 the Committee on the Development of Waterways and the Co-ordination of Railway and Waterway Service appointed by the United States Chamber of Commerce reported itself convinced that the plan should be carried out. A more friendly attitude has also appeared recently in New England, where an association, composed of business men from each of the six north-eastern states has been organized to advance the undertaking. The Associated Industries of Massachusetts have indorsed the

scheme, and the Boston Chamber of Commerce has reversed its previous hostile attitude. Favorable resolutions have been adopted by the Manufacturers' Association of Connecticut. President Harding announced himself in sympathy with the scheme, and President Coolidge has followed suit.

On the Canadian side of the border there is also a marked divergence of opinion as to the advisability of deepening the St. Lawrence. The prairie provinces are either opposed or indifferent. They now enjoy a smaller freight rate on grain from the west to the Atlantic ports than their neighbors to the south—a competitive advantage which they fear to lose through a general reduction of transport charges on account of the new waterway. Moreover, many people in the Canadian west are vigorously supporting the Hudson Bay route as offering a better solution of their transport difficulties than a deeper St. Lawrence. These are the chief reasons why the west of Canada takes a different attitude from that which has been adopted by the western states. But it is doubtful whether this opposition will be maintained in the face of the obvious advantages of the proposed undertaking. In the first place, the prairie farmers cannot long remain blind to the significance of cheaper rates in their competition with the grain growers of Australia and the Argentine who are not compelled to ship their produce such long overland distances. These countries are more serious competitors of Canada in the grain markets of the world than the United States where high rents and high costs of production are a serious handicap. In the second place, there are insurmountable obstacles in the way of utilizing the Hudson Bay route. The impossibility of navigating the bay in the late autumn and winter would render it necessary for wheat to be held over till the following summer. The high insurance rates on vessels taking the bay route would largely counterbalance the advantages arising out of a diminution of the overland distance.

Opposition also comes from the people of the province of Quebec and especially from Montreal, whose citizens are uneasy, at the prospect of sea-going vessels proceeding beyond their port to the upper lakes. They insist that navigation on the St. Lawrence requires all the available depth of water between Montreal and the sea, and that this may be interfered with by the proposed dams and power plants. They maintain that the delay in proceeding through the canals and the danger of damage would be such as to discourage ocean ships from proceeding up the river. They further declare that the cost of the undertaking was underestimated by the commission, and that, since border waterways must be free of toll, the carrying out of the plan would place an intolerable burden on dominion finances. They propose as an alternative the Georgian Bay route by way of the Cardinal and the Ottawa which could be constructed at a cost of only $80,000,000.

Probably the city of Montreal is needlessly alarmed as to the future of her harbor interests. The St. Lawrence according to the engineers, can be deepened without affecting the available depth between Montreal and the sea. Senator Reid takes the view that vessels of large tonnage will travel between Port Arthur and Montreal where they will tranship their cargoes to ocean vessels. This transfer could be effected, he claims, at less than a cent a bushel, and instead of damaging the trade of Montreal the improvement of the St. Lawrence would bring increased traffic to her harbor. Since an ocean vessel costs a great deal more to build than a lake freighter of the same tonnage, this argument seems reasonable. If a deep channel were provided the immense grain carriers now confined to the upper lakes would be able to sail to Montreal with the consequent saving of the expense involved in transferring cargoes from ships to railway.

The objection that joint construction and control would lead to international complication is one that has

been expressed on both sides of the border. In Canada it is feared that cooperative action in connection with the St. Lawrence will enable the United States to obtain more than her due share of control over what is virtually a Canadian waterway. In case the United States were at war with some power allied or friendly to Canada or the British Empire serious misunderstandings might arise with regard to the utilization of the St. Lawrence. Mr. F. M. Williams, state engineer of New York, asserted in his annual report for 1919-1920 that "the St. Lawrence project will take the control of the waterway out of the hands of the United States." In view of the fact that only a small portion of the river touches American soil, this seems to be a very extraordinary contention.

The dominion government is rather non-committal on the subject. Early in 1924 it was decided that expert engineers should report anew on the feasibility of the plan and the accuracy of the cost estimates. Canada's national debt of over $2,000,000,000 is a heavy burden for a country so sparsely settled, and it is not surprising that a large body of conservative opinion is opposed to any scheme designed to increase the country's financial obligations. This feeling is particularly strong in the maritime provinces which would share in the expense without participating directly in the benefits of the scheme. It is, of course, a standing grievance with these provinces that their interests are ignored by the wealthier and more populous provinces of Ontario and Quebec. The supporters of the scheme, however, have pointed out that the deepening of the St. Lawrence would serve to develop the coal and other industries of the maritime provinces by opening to them the markets of Ontario and the west.

There are some important points that must be settled before the work can be undertaken. There is the question of power rights to be decided. Before that

part of the proposals relative to power development can be carried out, some agreement must be reached between the dominion government and the province of Ontario. Any excess of water above that which is needed for navigation in the St. Lawrence is under the control of the Ontario Legislature. The latter is not disposed at the present time to countenance the giving up of Ontario power rights to any private interests in the United States, though that country affords the best market for the sale of electrical energy.

What is to be the distribution of the construction and maintenance costs as between the United States and Canada? This is another point to be settled. Many Americans claim that the United States will be paying for Canadian public works calculated to draw trade from their own cities. Many Canadians take the position that most of the ships using the proposed waterway will be owned by American companies, and that, therefore, the bulk of the profits from the improvements will go the United States. By such arguments each side tries to show why the other should bear the lion's share of the cost. The Joint Commission suggested that the expenses should be apportioned according to the benefit accruing from the waterway to the respective countries. How this benefit is to be measured is one of the unsolved problems of the projected undertaking.

Other problems have arisen such as the diversion of water through the drainage canal at Chicago, the alleged necessity of increasing the low water flow in the lakes, and the severity of the ice situation in the winter. But the obstacles to be surmounted are not chiefly those of an engineering nature. The competent engineers who advised the Joint Commission have pronounced the scheme practicable from that point of view. The chief impediments are economic and political. The unfortunate experience of Canada with railway development has made her cautious about the construction of public

works beyond the economic requirements of the country. Undoubtedly the opening of a new and efficient water route means the diversion of traffic from the railways. This is not as serious for the United States as it is for Canada. The American lines are pretty well congested with traffic, especially at crop moving time; but in Canada the railways are suffering from a lack of business. Should the waterway cut into the traffic which the railways now have, the people of the country will probably be compelled to carry the heavy burden of railway deficits longer than would otherwise have been necessary.

Except for those who have money invested in private power undertakings in Quebec, the possibility of great power development in connection with the St. Lawrence project is a feature that meets with universal approval. Sir Adam Beck, speaking for the Ontario Hydro-Electric Commission, predicts a dearth of power in Ontario within a very short time. The prospect of power generation is a big consideration for New England and New York state. It is claimed that high potential energy can now be distributed throughout a radius of three hundred miles without a loss of more than 6 per cent. But however far the beneficial influence of power generation may extend, it cannot compare in this respect with the area affected by the proposed navigational developments. The Joint Commission concluded that, "without considering the probability of new traffic created by the opening of a water route to the seaboard, there exists today between the region economically tributary to the Great Lakes and overseas points, as well as between the same regions and the Atlantic and Pacific seaboards, a volume of outbound and inbound trade that might reasonably be expected to seek this route sufficient to justify the expense involved in its improvement." The commission also pointed out that, because of the wider area and population served, "the benefits derived will

(at first) accrue in a much larger measure to American than Canadian interests."

It is fairly apparent that, unless something unforeseen happens, the supporters of the project will gain the day. The fact that some people will be damaged by the undertaking cannot be allowed to outweigh its great and obvious advantages. Someone must pay the price of progress. If there is any foundation for the prediction that in the future the industries and peoples of the world will congregate about the sources of water-power, we may perhaps look forward to the time when the basin of the St. Lawrence will have become a busy populous center of industry and the Great Lakes an American Mediterranean.

AFFIRMATIVE DISCUSSION

GREAT LAKES AND THE INDUSTRIAL DEVELOPMENT OF DETROIT[1]

The Erie Canal was a concession to the demands of the port of New York. We welcome all such improvements. The Erie Canal was built on the plea that improvements in the St. Lawrence would involve the United States in expenditures in Canadian territory and that Canadian ports like Montreal would be developed at the expense of American ports.

I tell you that this is a perversion of history and of fact. The St. Lawrence River is our river. It is an American river. Under the treaties of 1854 and of 1871 between these two nations, the United States has reserved and is granted an equal right with Canada in the navigation of the St. Lawrence through its entire course to the sea, similar to the rights enjoyed by Canada in the Great Lakes, excepting Lake Michigan. Now in Lake Michigan Canada has no treaty rights, while in the St. Lawrence we have treaty rights, through to the sea. It is as much our river, every drop of its waters, as it is Canada's. Up to 1825 all of the Great Lakes trade went east through the St. Lawrence River, even our merchandise to and from Boston and New York going by our river. And I want to say that our Great Lakes trade to New York and Boston and Liverpool and Savannah and Buenos Aires will go by way of the St. Lawrence once more.

The St. Lawrence is the greatest waterway in the

[1] From address by William P. Bradley, member Detroit, Michigan, City Council. *National Rivers and Harbors Congress. Proceedings.* 1924: 160-8.

world and it is ours. The great plain which it drains is the richest in forests, in minerals and in agricultural lands that exists on the earth's surface. The cities on the Great Lakes will, and already do, make the historical cities of Europe look like pigmies. But we are crushed and hampered and restrained by a few barriers in the St. Lawrence. These we must dig out without delay.

We have passed through several epochs; first, the days of St. Lawrence batteau trade, then the days of boat-and-wagon trade via the Erie Canal. The later covered-wagon trains to the Pacific were nothing compared with the trains of one hundred wagons that regularly left Detroit for the east in the early nineteenth century.

The Erie Canal failed to serve our needs, even in its own creeping days. Then came the railroad age. This railroad development created modern New York and modern Chicago, but this railroad transportation has broken down; it will no longer do. Modern commerce is too vast. It would take far more money to build adequate new railroad lines and terminals than to find new water outlets.

Enter the motor transport. It is significant that Detroit, herself so badly in need of cheap transportation, gave the motor car to the world. It was thought that motor transport plus railroad transport would solve the problem; but not so. The problem of economic distribution is now and always will be one of terminal costs—and handling involving human labor. The congestion at the great national terminals has become grotesque. Rehandling charges have placed a great tax upon commerce and have added to the cost of living. Not even the aeroplane (in the development of which Detroit will be first) will solve this problem of terminals and rehandling.

The cheapest form of transportation and terminal reshipment is and will forever be the ship on the water, loading and reloading at a dock where railroad cars

await. And so Detroit enters her next and her best phase, which was her first phase, water transportation to the ports of the world via our St. Lawrence River.

The Erie Canal performed a service. But at less cost the St. Lawrence could have been deepened to admit greater traffic. The failure to create this St. Lawrence waterway enabled the Atlantic seaboard ports to prosper by taking toll of the middle west. These ports did not prosper at the expense of the Canadian ports, but at the expense of Detroit and the other lake ports. In fact, the failure to modernize the St. Lawrence helped to make Montreal, for it compelled surplus trade to go overland to Montreal and reship from rail to boat at that point of toll-taking. Had the St. Lawrence canals been deepened instead, Detroit and Chicago would now be greater ports than London, and Duluth and Ft. William would be second Montreals. For a ship will search out the farthest inland point to which ocean navigation is possible, whether it be on the Manchester ship canal, on the Thames, on the Neva, on the Delaware or on the St. Lawrence. It is stupidly short-sighted for Chicago to allow a few stockholders in light and power companies to lower the lake levels even one inch, when each foot of lake channel draft is so vital. The Chicago drainage excesses simply must not be permitted.

The ocean ships have already come to Detroit, scores of them seeking out lake trade. Ever since the first glacial thrust hollowed out these lakes, as by the hand of God, this has been the natural channel for North American activity. Ever since the small batteau of the explorers entered these waters on what they called the "Quest of the Age," ever since the "Griffon" first spread its sails on Lake Erie and since in 1818 "Walk-in-the-Water" first panted its mechanical way through these channels, Detroit has been the natural port of the region.

Twenty ships from Norway visited our port in the past year or so—and this thanks to Canadian enterprise,

not to ours. The St. Lawrence route can be made navigable for 80 per cent of the ocean-going ships at a cost of less than $150,000,000, which, compared with the $400,000,000 cost of the Panama canal, is small. The Canadians are spending $100,000,000 to deepen the Welland Canal at Niagara alone, to accommodate even their trade. We should be heartily ashamed of ourselves at the comparison. For the St. Lawrence River is our river as well as Canada's and for us to neglect its improvement shows national blindness.

The Welland Canal locks are being accommodated to 30-foot draft. In the estimates cited by the International Joint Commission, a 30-foot canal depth on the St. Lawrence is given only as an alternative, the primary plan being for a 25-foot canal.

I am for a 30-foot canal from Duluth and Chicago to the sea. The cost is insignificant compared with the benefits. No man, whether he live in New Jersey or in Alabama, can call himself a patriotic citizen who, when he visualizes the greatness that can come to this nation through the joining of the lakes with the sea at so small a cost, will allow his own narrow trade advantages in Atlantic seaboard toll-taking, or his own remoteness from the scene of the improvement to influence his action. The national prize is too great. It will add to the value of every area of land in the middle west. It will save fifty million tons of coal annually. We have those objectors who ask where is Detroit's present water trade that she should be so concerned, and where are her facilities for handling ocean traffic? In reply we ask where is the St. Lawrence waterway development? It is bound up in that port of New York jumble where Detroit freight lies sometimes for a month while New York takes toll. The less facilities New York has for taking care of the transfer of European freight billed to Detroit, the more money New York makes.

The port of New York and the railroads of the coun-

try, plus motor transportation, have been proved inadequate for handling the gigantic commerce of the modern industrial world. Detroit supplies most of the motor-transport vehicles. Would we be so short-sighted and selfish as to oppose all railroad and waterway improvements merely because we thrive making automobiles?

Detroit ships twenty-two million tons by rail and two and a half million tons by boat to domestic and foreign points. Detroit exports seven million tons by rail for foreign export, and only one hundred and fifty thousand tons by boat. We are isolated by a national policy of neglect. We are at the mercy of the port of New York.

Give us a 30-foot channel to the sea—in other words modernize our St. Lawrence River and restore it to its former place in our commercial life. Then we will show you a port of Detroit, municipalized, modernized, on the finest and most economical waterfront in the world. For the Detroit River never overflows its banks; it never dries up, nor shifts its course; it has no tides, no storms, no dangers, neither barnacles nor earthquakes.

Will we use a lakes-to-the-sea waterway? Already the 14-foot Welland Canal and the upper St. Lawrence has a commerce equal to the combined tonnage of the new Erie Canal and the Mississippi basin above New Orleans.

The billion dollars worth of freight that enters the Detroit River annually originates mostly at the head of the Great Lakes and is destined for the foot of the Lakes. This shows that the long haul is essential for economic waterway commerce. Detroit imports and exports annually from the seaboard $200,000,000 worth of goods by rail, upon which it pays a freight bill to the amount of $80,000,000. The St. Lawrence waterway, eliminating all the New York-to-Detroit rail cost and the New York terminal cost, would pay for itself from Detroit trade alone in one generation.

Who could have foretold the tonnage and the value

of Chicago or Detroit commerce that resulted from the building of the railroads? Who can foretell the vast tonnage of Detroit import and export commerce, when, by putting a few dredges and a few stone masons to work at Cornwall on the upper St. Lawrence, Detroit is placed on a level with Liverpool in world trade? The middle west already furnishes more than half the United States commerce tonnage. When we cut our way out to the sea and take our place in the sun, the middle west will dominate all the national activities.

In one year one thousand different freight vessels enter the Detroit River, these making twenty thousand passages, one vessel passing every ten minutes, some of them six hundred and twenty-five feet long, drawing twenty-one feet of water and carrying fourteen thousand tons. The total freight thus carried amounts to some sixty-nine billion tons annually, valued at $1,000,000,000. This tonnage is twice as great as the combined tonnage of the Suez and the Panama canals.

To have prophesied such a traffic would have been to be regarded as an irrational dreamer fifty years ago. Who has any right now to try to belittle our much better founded dream of the future?

Detroit pays $10,000,000 freight charges on automobiles shipped by rail to the seaboard annually. And it takes from two to three weeks to transfer this freight from railroad car to ship, because of New York port congestion. Had we an adequate waterway, we could ship these automobiles direct from Detroit to Liverpool for $10,000,000 and they would arrive there in nineteen days, or, on the average, less time than it takes to extricate freight from the terminal congestion in New York. On Detroit's total annual freight bill to New York, amounting to $80,000,000, we could save $30,000,000 by using an adequate all-water way to Europe.

Time and human labor are two vital elements in the cost of living. We have solved the problem of produc-

tion. We are producing too much food, too much clothing, too much coal, lumber and steel. These lie heaped up at the point of production awaiting distribution. Our protesting farmers grow the wheat, but their remoteness from the seaboard leaves these resources frozen. The cost of transportation and the time and labor involved in railroad handling and rehandling are gigantic obstacles. Besides this terminal delay and these terminal labors and costs, the lack of through billing prevents financing upon bills of lading. Warehouse-receipts financing is impossible where freight lies on sidings awaiting warehousing and other transfer service.

As for the economics of water transportation, copper mined in Montana reaches New York via Seattle and the Panama Canal; Puget Sound lumber reaches Indianapolis by way of Panama and New York. It costs more to ship Iowa wheat to New York than it does to bring Argentine wheat to New York.

Detroit uses four million feet of cedar annually. It comes from South America, but is intercepted at New York and from New York to Detroit the great toll is levied. A deep waterway will save the New York-to-Detroit cost and the New York terminal cost. It would add only a day or two to the navigation, including canal-lock delays, and would avoid one, two, three and sometimes four weeks delay in the New York terminal—for Lake Erie is as near to Liverpool as New York is.

Water transportation, as every well-informed person knows, is much faster for bulk freight than is rail transportation, and the cost is only one-seventh as much.

The Panama Canal is serving a great purpose. But the middle west has been handicapped in favor of the seaboards because of the fixing of rail rates to meet Panama water rates for certain sections inland. But we have accepted these discriminations in the belief that what benefits the whole nation will ultimately benefit us. The proposed Great Lakes-St. Lawrence improvement

is endorsed by most of the states of the Ohio valley and the northwest. It is endorsed by the Associated Industries of Massachusetts, by the Mississippi Valley Association, by the American Bankers' Association, by the farm and labor associations, by the Secretary of Commerce, and finally by the International Joint Commission, permanently established to promote comity between Canada and the United States. It would provide for a 25-foot waterway, six hundred feet wide, between Montreal and Lake Erie, in conjunction with the existing 21-foot waterway between Lake Erie and Duluth. The Welland Canal portion of the channel at Niagara is already being constructed by Canada at a cost to her of $100,000,000.

The Panama Canal cost $400,000,000. It is paying for itself, even on a no-toll basis for American and British ships. The deepening of the Cornwall section of the St. Lawrence (all within international waters and south of the junction of the boundary line and the St. Lawrence) will cost $252,000,000. But, of this, $150,000,000 is for the incidental development of a water power yielding one and a half million horse-power, the earnings of which would pay for the entire work in a few years. Objections have been raised against this project, coming from those who benefit either by the Erie Canal direction of trade or by Atlantic seaboard rail and terminal earnings. They have claimed that, as the greatest ocean liners are not able to use a 25-foot or a 30-foot canal, the proposed St. Lawrence waterway would not invite ocean-going ships. The commerce of the ocean is carried by tramp steamers and not by showy Leviathans. And these tramp steamers enter the ocean ports of the world, which, Lloyds shows, average from twenty-four to thirty feet in depth. Eighty per cent of the ocean ships could use the proposed waterway, which will suffice for our purpose.

Then it is claimed that the lake ships are not suited

to ocean trade. We have no lake ships that need to enter the ocean trade. They are designed for lake trade and will be needed for that service. We design boats for the trade according to the demands of the service.

We are told that our ports are closed five months of the year. Well this has not prevented Montreal from becoming the second largest port on the Atlantic seaboard. For that matter the Welland Canal is open eight months of the year while the Erie Canal, on which so much money has been spent, is open only six months.

We are told that the traffic must slow up in the channels. The delays in the channels are not greater than incidental delays from fogs and storms on the ocean. And if a few hours were lost by locking delays, think of the days and weeks of terminal delays, in New York and other seaboard transfer points, that would be avoided. We are told also that ocean cargo boats do not find it profitable to gather up partial cargoes. This is ridiculous. Gathering up partial cargoes on the lakes would be much more profitable than making tremendously long hauls between ocean ports for the same purpose. The Norwegian, Swedish, Danish and English boats now entering the lakes from the sea in search of cargoes find it profitable, even though they can load only to 14-foot draft today when passing the Welland Canal.

Henry Ford has sent two ocean-going ships to South America from Detroit, loading them partially at Detroit and shipping the balance of the cargo by rail to Montreal, where the ships take on the remainder of the cargo and proceed.

New York offers the barge canal as a substitute, proposing, if that won't do, to extend the Hudson River channel from New York to Albany, offering, if that won't do, to build a ship canal from Oswego to Troy—anything to prevent the west from gaining access to the sea.

The Erie Canal will not do. It has been obsolete for more than thirty years. The barge canal won't do. At an expenditure of $175,000,000 New York has completed an improvement which, no doubt, has its uses but which does not in any degree satisfy the needs of the west for an uninterrupted outlet to the sea. The deeper Hudson to Albany won't do. There is still the passage across the state of New York through which ships cannot go. Nothing less than a ship channel will satisfy the needs of the west.

A ship channel across New York won't do. United States army engineers have reported over and over that it would cost twice as much as the St. Lawrence improvement; that it would be at best a restricted channel for more than one hundred miles, and that the supply of water at the summit level presents a formidable, if not fatal, difficulty.

The veriest layman can see the difference. Less than fifty miles of canal section—barely thirty miles—will open the St. Lawrence route to ships. By any plan there must be more than one hundred miles of canal section to cross New York. The St. Lawrence follows the water grade. A ship channel across New York must climb from Lake Ontario to the summit level at Rome, and climb down again from the additional altitude to the sea level. It is a poor second best and the west is entitled to the best route and will be satisfied with nothing less.

Every argument they bring against the St. Lawrence route applies with double force to the New York route which would cost twice as much; which would be subject to twice the hindrances; and which would debouch upon the ocean five hundred miles farther from northern Europe than the present terminus of lake traffic at the foot of Lake Erie.

The barge canal is a laudable improvement and will be, we hope, a useful improvement. Detroit industries are using it now all they can, and if it is made more

usable they will use it more. But Detroit and its sister cities in the middle west are entitled to the open road to the sea by the natural outlet along the line of least resistance. *They will welcome any auxiliary improvement, but they will accept no substitute.*

THE TRAGEDY OF INADEQUATE TRANSPORTATION[1]

America's tragedy of transportation will cost at least $500,000,000 and may run up to $1,000,000,000 this year (1922).

And this is a total loss to the farmer, the fruit grower, the shipper, the dealer, and—the consumer.

In other words, the present transportation jam in the United States, a tragedy almost every year, is being staged on the most enormous scale in the history of the country, and it may cost the American people as much as $1,000,000,000. And there is very little relief in sight.

Each year, of course, there is a special reason for the tragedy of transportation. One year it is business depression, another, strikes, and then it might be a shortage of equipment. But every year for the last fifteen years America's tragedy of transportation has been staged annually immediately following the opening of the harvest season.

In other words, the American railroads have undertaken a job that they are unable to fulfill. Whether it is business depression, strikes, equipment shortage or weather, the railroads have always found an excuse. This year several strikes, including the coal strike, added to the usual difficulties encountered by the roads, and embargoes on the shipment of certain commodities have been in force ever since last August.

[1] By A. B. Kapplin. *Pan American Magazine.* 36: 229-30. December, 1923.

Rotting on the Farms

Millions of bushels of grain, potatoes and fruit are rotting on American farms, exposed to the elements and soon will freeze, all because the railroads are unable to carry the load.

The load accumulating at the eastern seaboard has become too big for handling; the continued flow to the eastern terminals has choked every outlet; the distances from the far west to the extreme eastern ports are too extensive for logical train hauls—and the country continues to suffer.

There is not sufficient equipment and there has not been sufficient equipment to handle America's transportation for the last fifteen years.

And this year, particularly, on account of the railroad strikes in the shops and the coal strike, the equipment in use is far from able to handle the enormous crops.

More serious than the actual loss to farmers, shippers and consumers, is the danger of a reduction in production and the closing of markets. America's tragedy of transportation comes, of course, when business is good, when it is very good. Congestions at almost every port along the eastern seaboard simply turn the transportation machinery of the nation back on itself. There is a backfire that hits the very opposite coast and production soon is strangled altogether.

Julius H. Barnes, president of the United States Chamber of Commerce and head of the United States Grain corporation during the war, one of the biggest grain exporters in the world, estimates the loss to farmers this year at $400,000,000. In a statement published in the *Herald* he shows just what great losses the American farmer will suffer this year on account of the present transportation problems.

This $400,000,000 is estimated, of course, but it does not include the losses to the fruit growers, the shippers, the manufacturers, consumers, all of whom must suffer because of a lack of railroad equipment sufficient to move cargoes to and from the East.

The potato crop will suffer a loss of about $25,000,000 this year because thousands of bushels are lying in yards waiting to be shipped East. This situation is no different than the conditions in the grain market, concerning which reports have reached Duluth to the effect that elevators throughout the West are all filled to overflowing, that large piles of grain are stacked outside of elevators and alongside railroad tracks that elevators in all ports are filled, and that Buffalo is now experiencing its biggest congestion. Elevators are filled, boats are filled and there are not a sufficient number of cars to carry the grain away.

So it is with the fruit crops, that may suffer a $10,000,000 loss.

From the first of September until late in October, in the very height of the crop-moving period of this country, the main channel of export outlet for grain in America, from Buffalo to New York, was practically closed. For thirty days the four great trunk lines that serve that channel of movement contracted no grain for movement. The grain moved from the West until it had congested and exhausted the elevator facilities of Buffalo—18,000,000 bushels. As soon as the unloading facilities were thus exhausted the lake carriers, reflecting the apprehension of their owners that the boats would be tied up with undischarged cargoes instead of being returned, made an advance in the lake rates in thirty days, from 2 cents per bushel for the carrying of grain from Chicago and Duluth to Buffalo, to 6 cents.

The rail rate from Buffalo to New York on the published tariff is 9 cents, but practically no grain was moving. The route that was open—the Erie canal—with totally inadequate facilities, advanced the rate to 13 cents per bushel, paralleling the railroad, which was supposed to carry it for 9 cents.

From Buffalo to Montreal is a water route. It is equipped with the facilities of forty years ago. It can handle a vessel of 250 feet in length, when the lake carrier of today west of Buffalo is 600 feet in length. That means that the carriers that operate on this 40-year-old route are limited in number, and limited more in carrying capacity. Thirty days ago those carriers were operating on a tariff from Buffalo to Montreal of 6 to 7 cents per bushel. Last Saturday 15½ cents was paid for the carriage from Buffalo to Montreal. That is the pressure of grain west of Buffalo seeking an outlet to foreign markets.

The effect of the market rise in prices has been this: In thirty days the foreign price of wheat has advanced 25 cents per bushel, the foreign price of corn has advanced 20 cents per bushel, because those markets are indequately supplied. The

market price in America of wheat has advanced 10 cents per bushel, and of corn 10 cents per bushel. That is, the spread between the ultimate foreign price which should be reflected back to our farms, has widened from 10 to 15 cents per bushel because of the lack of adequate facilities to move the crop pressing on the market in the West.

I make this statement out of thirty years' experience as a grain exporter, watching the diversion of grain from route to route for a half-cent per bushel economy of one route against another. As a member of a trade that has been content for years to lift grain from the Western primary markets, like Duluth, Fort William and Chicago, and deliver it to Hamburg and Rotterdam and Liverpool and London for a charge of 1 cent per bushel, I make this statement, that we have today 4,000,000,000 bushels of grain in the West, the value of which to the farmer in every market in the West is at least 10 cents a bushel below a proper relation with the European consumer markets. You take 10 cents per bushel, assuming this continues through the crop year—and it won't, thank goodness—and it would mean a loss in farm revenues of $400,000,000.

THE GREAT LAKES-ST. LAWRENCE WATERWAY PROJECT[1]

In these days of unrest, strife, commotion and rebellion throughout the known world, it is refreshing and inspiring to find one great project upon which all parties, factions and classes of a substantial portion of the country can cordially and heartily unite.

I allude to the Great Lakes-St. Lawrence waterway project. I think the name, St. Lawrence ship-canal, is a misnomer because of the fact that the canal portion is so insignificant. Only about forty-six miles of river is to be improved and thirty-three miles of that is to be canalized. With this done, you have a broad water highway leading from the interior of the country to the ocean and the ports of the world.

The people favoring, urging and demanding this improvement are the people living adjacent to the Great Lakes, forty millions of them. They inhabit the world's

[1] Address by Honorable C. A. Lamoreux, of Ashland. *Wisconsin State Bar Association. Proceedings.* 1922. p. 161-7.

greatest productive area and a district capable of wonderful manufacturing development. This district produces 75 per cent of the wheat of the country; 65 per cent of the corn; 100 per cent of the flax; 85 per cent of the iron; 40 per cent of the copper; 74 per cent of the zinc and 46 per cent of the lead. The important manufacturing industries of this territory include agricultural implements, automobiles and accessories, rubber manufactures, meat packing, iron and steel, paper, furniture and many others. Sixty-three and three tenths per cent of the aggregate value of all farm property in the United States is within the tributary area of the proposed waterway.

The opponents of this enterprise are a portion of the people of New York city and of the state of New York and a few scattering points in that vicinity. Their opposition is purely a selfish one—afraid it will injure the harbor of New York or some of the other Atlantic seaports. While conceding that the west is paying an enormous toll for the privilege of transferring freight from railroad to boat at New York and other eastern ports, they are selfish enough to fight the project for fear of loss of business. Upon this point the International Joint Commission to say:

> The opposition to the suggested improvement centered largely in the State of New York, but was also supported by representatives of various public bodies in New England and in some of the Atlantic coast states south of New York, as well as in the city of Montreal. The commission is satisfied that many of those who have opposed this project did so because they were convinced that it was impracticable and not in the public interest. It is equally satisfied, however, that much of the opposition had its source in what might be called local patriotism. That is to say, that many citizens of Buffalo, Montreal, New York, Albany, Boston, and Philadelphia were determined to oppose the project mainly because they believed that it would adversely affect the interests of Buffalo or Albany or the New York Barge Canal, or of the great seaports of New York, Philadelphia, Montreal, and Boston. On the other hand, the demand for the waterway comes mainly from the area which is most vitally concerned in the opening up of a new transportation route to the seaboard.

It is estimated by government engineers that the cost of the project will approximate $252,000,000; this to be divided between Canada and the United States. The improvement contemplated will result in the saving on grain of from 8 to 10 cents a bushel and this saving will affect not only the grain which actually moves for export, but practically all that produced within the area tributary to the Great Lakes. This saving will amount annually to approximately the entire cost of the improvement required to admit ocean vessels into the lakes. In view of the importance of having available at all times a route which will enable the producers of the great northwest to market their products expeditiously and economically at the moment of greatest demand, the opening of this deep-water route is regarded as of national importance and fully justified for this purpose alone. So it is not a sectional question. It is of national importance.

To illustrate this saving in freight—from Chicago to Boston the rail distance is 1,034 miles as against 2,682 by water; from Duluth, 1,513, by rail, 2,775 by water. To transport a ton of freight from Chicago to Boston by rail it costs $15.51; by water, $5.36. Again, at present, to carry by water from either Chicago or Duluth to Buffalo, the freight is 2 cents a bushel on wheat, and based on the same mileage basis with due allowance for delays in canals and locks, 3 cents a bushel would be a fair rate from Buffalo to Montreal. The lowest rates at which grain can be carried from the above mentioned water ports to tide waters, via rail and water route, would be 2 cents per bushel to Buffalo and 12 cents from Buffalo to Boston or New York, a total of 14 cents. This shows a saving of 9 cents a bushel by way of the St. Lawrence. The ocean rates from Montreal and New York to Liverpool are the same.

Alfred E. Smith, former governor of New York now commissioner of the port of New York, gives some

startling figures upon the cost of transferring freight at New York. He says the port of New York is about as antiquated as a carpetbag and just about as useful for the transportation of freight. The destruction of a pier built in 1808 and another built in 1848 has only recently been accomplished, and "we are even now building others that are almost as old and useless in design."

He then goes on to say,

> Now here is what happens to freight in the port of New York. A hundred pounds of potatoes start from a point in Michigan 1,120 miles away for delivery, say, to a dealer in Washington Market in Manhattan, who will sell it to a retail dealer in the Borough of the Bronx.
>
> The trip of 1,120 miles from Michigan is made in seventy-two hours at a freight cost of twenty-eight cents.
>
> The freight car lands at the Jersey meadows at the break-up yards—where the long freight trains are broken up into cars and unloaded and sent on to their separate destinations—two to seven miles from various points in the City of New York. Because of the difficulties and the delays and inefficiency of freight transportation at the gateway of the United States, the consignment of potatoes remains as long waiting on the Jersey meadows as it took to come all the way from Michigan. It is then shifted to the water-front area, where it remains twenty-two hours more, waiting to be loaded on to a flat-car which will carry it across the river. It takes two hours to do this.
>
> It is then unloaded on to a pier on the Island of Manhattan, where the piers are choked with merchandise and the streets crowded with trucks. Here it remains on an average another fourteen hours. It is finally taken away and spends an hour going to Washington Market. Here it is unloaded and spends another twenty-four hours before being shipped to its final destination in the Bronx; which consumes another two hours.
>
> By that time, it has taken ninety-one hours to cover a distance of seven miles, and it has cost forty-one cents for the hundred pounds of potatoes.

Here we have a sample of what the west is up against in attempting to send its freight through New York harbor. In order to expand and grow a people must have adequate and cheap transportation. The middle west is now confronted with what Governor Allen called the "tragedy of transportation." With the cheapest and best transportation route at our very door, we have gone on year after year paying toll to New York and paying

excessive railroad freight rates until the time has come when we realize something must be done. We are brought face to face with world competition in all lines. In this competition we are equiped to meet them squarely on every point but transportation and there we meet with a prohibitive handicap.

Argentine can land its wheat cheaper at New York than we can.

In European countries thirty-five miles is the average rail haul to water. In the United States the average is one hundred and thirty-five miles. One does not at a glance grasp what it means to haul freight one hundred miles further by rail; yet one can readily understand that this difference in distance will build a city at a favored point and crush the hopes of another aspiring community one hundred miles away. So it is with nations.

Not until the great war stressed the tragedy of our lack of transportation facilities did the absolute necessity of improving this great waterway force itself upon the attention of the people. Then it was realized that here nature had provided a natural highway to and from the heart of the continent and that this highway must of necessity be improved so that the middle west could transport its products over the same.

To accomplish this, the International Joint Commission of Canada and the United States, which is a standing commission, were directed to make an investigation of the project, they to be assisted by government engineers and upon completing the investigation to report the results thereof to Congress. The commission finished its investigation late in 1921 and their report was laid before Congress in January, 1922. This report consists of a printed book of one hundred and eighty-four pages with numerous maps, going into the project most exhaustively. About a year and a half was spent in the work.

Speaking of the steps taken by the commission to arrive at the merits of the project, they say:

As the first step toward marshaling the evidence. the Commission had prepared a series of briefs covering the material already available in printed or other documentary form bearing upon the subject matter of the investigation. With these before it, a preliminary hearing was held at Buffalo on March 1, 1920, at which the views were obtained of representatives of various commercial and other organizations as to the general scope of the investigation and the main aspects of the problem. There after the commission held public hearings at various points on both sides of the international boundary, from Boston, New York, and Montreal in the East to Boise and Calgary in the West, at which everyone interested in the investigation, whether his views were favorable or unfavorable, was given the fullest possible opportunity of submitting facts or opinions bearing upon the subject matter of the reference. These hearings resulted in the accumulation of an immense body of testimony, which has since been carefully digested so as to bring together all the essential elements. The commission has also availed itself of the services of statistical experts, both in Washington and Ottawa, who have analyzed and checked the statistical data submitted at the various hearings, procured additional material, and put the whole into the form of comprehensive statistical studies of the situation.

And as a conclusion the commission has to say:

To sum up as briefly as possible its conclusions in the matter of the proposed improvement of the St. Lawrence River between Lake Ontario and Montreal, the commission finds nothing in the evidence to warrant the belief that ocean-going vessels of suitable draft could not safely navigate the waters in question as well as the entire waterway from the Gulf of St. Lawrence to the head of the Great Lakes, or that such vessels would hesitate to do so if cargoes were available.

It finds that of the various alternative routes mentioned from the interior to the seaboard, none offers advantages comparable with those of the natural route by way of the St. Lawrence.

As to the economic practicability of the waterway, the commission finds that, without considering the probability of new traffic created by the opening of a water route to the seaboard, there exists today between the region economically tributary to the Great Lakes and overseas points as well as between the same region and the Atlantic and Pacific seaboards, a volume of outbound and inbound trade that might reasonably be expected to seek this route sufficient to justify the expense involved in its improvement.

We often hear it questioned as to whether there will be sufficient freight for export and import to warrant

the expenditure for this improvement, and we find it difficult to bring to mind such commodities for shipment. The commission report says:

> The principal commodies which will be brought into the lakes over the deep waterway will be pulp wood, wood pulp, sulphur, china clay, coffee, cocoa, sugar, fruits and nuts, rubber, fertilizer materials, lumber, hides, canned goods, asphaltum, gums, tanning extracts, sago and tapioca, fibers and textile grasses, flaxseed, seed for planting, spices, vegetable oils, granite, and hardware. The principal commodities which will be shipped outward will be grain, iron ore, iron and steel, agricultural implements, automobiles and vehicles, salt, copper, meat dairy products, and the countless manufactures of the industrial centers of the Great Lakes. Within a short period after completion of the deep waterway the commerce should amount to approximately 20,000,000 tons, with continued growth in the future.

Beside this it will be borne in mind that it will at once open water traffic with the Atlantic seaboard, at a freight rate at one-third of what we now pay, and that trade will be very large.

With this improvement made, it will give us an open way to the ocean and the ports of the world, with a channel depth of twenty-one feet, except in the Welland Canal, which now has fourteen, but is being deepened to twenty-five which work is now more than half complete. It will enable 70 per cent of all ocean-going vessels to come at once to our lake ports.

It must be borne in mind that in addition to the great transportation advantages this improvement contemplates the development of an enormous hydro-electric power which it is believed will at once be utilized and will mean the growth and development of extensive manufacturing operations throughout the state of New York and throughout New England. Beside this, it will mean an enormous saving of coal and will release for railroad traffic thousands and thousands of freight cars now used in transporting coal to the manufacturing districts of New England.

The point has been made that this country should

not expend its money in improvements in territory outside the United States. The commission have gone into that subject very carefully. It is found that by treaties now existing between Great Britain and the United States and the Dominion government,

> the navigation of the St. Lawrence River ascending and descending shall forever remain free and open for the purposes of commerce to citizens of the United States, subject to any laws and regulations of Great Britain or of the Dominion of Canada not inconsistent with such privileges of free navigation.

It will be found that the rights of this country are already fully safeguarded by treaties and it must be borne in mind that in all the traffic up and down the lakes between here and points beyond Buffalo, boats have always gone through the Welland Canal, which is owned by the Canadian government. Our boats have been accorded the same privilege as theirs and there can be no possible argument against expending this money outside the borders of the United States with the treaty safeguards. Canadian boats have the same rights upon Lake Michigan as our own.

In conclusion, the President has approved this project. Already steps are being taken looking toward negotiations with the Canadian government to perfect a plan of operation. New York will continue to fight us so long as there is a fighting chance. She cannot bear to let go the rich toll we are paying for the privilege of transferring our products from land to boat in her harbor.

WHY THE WEST DEMANDS ACCESS TO THE SEA[1]

I wish you could place yourselves in the great west today, the food-producing section of the country, and

[1] From address of Honorable James P. Goodrich, ev-governor of Indiana before the New York State Chamber of Commerce. *Chamber of Commerce of the State of New York. Monthly Bulletin.* 15: 46-55. February, 1924.

visualize our situation. Marooned by the high freight rates and crowded back by the increase during the past six years, more than fifteen hundred miles farther from the world's market, where the price of every bushel of our grain is fixed, we are selling our grains at a less price than we did before the war and compelled on account of the high freight rates, increased wages and cost of manufacture and distribution, to pay almost double the pre-war price for everything we buy.

When we apply for relief through reduction in freight rates, we are very properly told that the reduced rates would imperil invested capital. When we asked for the waterway that we believe will give us relief, the General Assembly of your state, without any investigation whatever, passes a resolution against the improvement. The governor of your state, takes a like position. Your great commercial organization opposes us and you tell us, among other things, that this improvement we believe so vital to our prosperity must not be made for the reason that it will take some business away from the ports of New York and Buffalo and endanger your investment in the Erie Canal.

We have tried to see and understand your position and have with great care considered your objections. Today we wish to answer these objections and to present to you our position with the hope that out of this discussion may come a modification of your views. The story is told that two knights in olden times met one day along the highway on opposite sides of a shield suspended over the road. Said one to the other: "This is a beautiful white shield." "No," said the other, "but it is black." The first knight replied: "Thou liest. It is white." A furious battle began during which the knights changed sides and lo! each beheld the other spoke the truth, for it was white upon one side and black upon the other. So today we again express the hope you will come over to our side, not in the midst of lusty battle,

as the two knights of old, but come led by a generous desire to help us. In helping us you may help yourself, for if we find freer markets and obtain a better price for the grain we raise, it is only loaned to us for a little while. After we have taken out enough on which to live; the rest we use to pay the interest on the mortages and the bonds you hold against us, or to purchase the manufactured goods we must have and which you produce. Whatever you may temporarily lose in the way of lost shipping, may be but bread cast upon the waters that will return to you many times over in the added prosperity to the great hinterland without the development of which you cannot succeed and prosper.

The time at my disposal does not permit me to go into the history of the movement for the construction of a waterway connection of the Great Lakes with the ocean. To this audience this can hardly be necessary, for I presume you would not have placed the stamp of your disapproval on a project of such vast importance as this without first having acquainted yourself with the history of the efforts made to accomplish it. It is not improper, however, to suggest that three international joint commissions have been appointed to investigate the entire subject. Two surveys have been made by competent engineers and the last went into an exhaustive survey of the proposed work and made a most complete estimate of its cost. The third commission held hearings in the principal cities of the United States and Canada. The report of the engineers and the three commissions were all unanimously in favor of the construction of the waterway. The last reports filed in December, 1922, we believe answer in the most complete fashion every objection urged by your organization in 1921.

President Harding declared in favor of the waterway and said: "It is the most important domestic project before the people of any nation today." President

Coolidge urged its construction in his first message to Congress. Herbert Hoover, whose accurate knowledge of the subject is beyond question and whose breadth of vision is nation-wide, referred to the St. Lawrence waterway last month as "the outstanding opportunity of the American people." Julius Barnes, president of the American Chamber of Commerce, has recently endorsed it in most emphatic terms. Mr. Cooper, who constructed the great Keokuk Dam across the Mississippi, not only endorsed it, but says: "That it is justified by the amount of power produced which will in the end pay for the entire improvement." It has been recommended by the American Bankers Association, the state farm bureaus of the various states, the Mississippi Valley Association, the American Farm Bureau Federation, the Associated Industries of America. Eighteen states with 40 per cent of our population producing 73 per cent of our corn, 77 per cent of the wheat, 81 per cent of the oats, 54 per cent of the cattle, 49 per cent of the sheep, 66 per cent of the hogs, 56 per cent of the eggs and 51 per cent of the butter of the country are committed to the waterway by formal resolution and by appropriations of money to bring about its construction. Opposition to it has been confined to the state of New York, to the ports of Baltimore and Philadelphia in this country, and to Montreal in Canada.

Notwithstanding this almost universal approval, if our faith in this great enterprise is not well-founded, our will should not prevail. Temporary majorities are not always right and if we are to succeed, we must be able to give good reason for the conviction we hold, to demonstrate that the enterprise is of such national importance as to justify the government in directly undertaking the work or lending its credit to an international corporation organized for that purpose.

I am certain if each one of you could take the time carefully to examine the report of the commission and

engineers, the state of New York, and your organization would no longer stand alone of all the American states in opposition to this great national enterprise, but that you would lend your influence to the speedy construction of the work.

Among the objections offered by your organization to the construction of the canal are:

1. That "it will cost from $300,000,000, to $500,000,000, according to unofficial estimates."

There is no need of guesswork on this matter now. The official estimates are on file and have been since December, 1922, and they show the cost of a 30 ft.-seaway, including the development of 1,465,000 horsepower to be $275,000,000. These are the estimates made by the very best engineering talent in America.

From the experience at the Welland Canal, the Roosevelt Dam and other works of similar character, we feel warranted in saying that the estimates on the St. Lawrence are well within the cost. The Welland engineers say that they are 10 to 15 per cent too high. The actual cost of the earth excavation of the Welland Canal is 60 to 65 cents a cubic yard, for rock $1.66, for concrete $7 to $8 a cubic yard. The Roosevelt Dam 50 to 60 cents for earth, $1.97 for rock and $6.69 for concrete, while the engineers' estimates on the St. Lawrence waterway is 50 cents for earth excavation, $1.75 for rock excavation and $12 for concrete, substantially more than either of the others.

Again you say, there is "nothing in the record of traffic statistics of the Great Lakes which would point to a likelihood, present or prospective, of a movement of export or import freight by this route sufficient to justify such an expenditure."

This same assertion was made years ago against the construction of the New York Central Railroad in opposition to the Erie Canal.

The two factors that make traffic are cheap transport

and a productive and consuming region to furnish the freight. The Panama and Suez Canals were justified by traffic which did not move at all until waterways made it possible. The tonnage in sight from the lakes-to-ocean route is more than ten times the tonnage in sight for the Panama Canal twenty years ago. The movement of steel products between the shores of the Great Lakes and Atlantic seaboard is at least fifteen million tons a year. One and one-half to two and one-half million tons of iron ore move each year from Lake Superior to the Atlantic. Not one ton of it now goes by water. Mr. E. G. Grace of the Bethlehem Company says: "Certainly it would go by water as far as Sparrow's Point is concerned." Knox Brothers of Montreal and the president of the British Empire Lumber Company, heavy lumber dealers, say a heavy traffic in lumber is certain to move direct from Pacific ports to the cities on the lakes. In short, all of the witnesses before the commission except those from New York, Philadelphia, Baltimore and Montreal testified that *ocean* ships would sail to the Great Lake ports and that there was ample traffic in sight to warrant the construction of the waterway.

It is also objected that "as vessels must use a channel involving a distance of fifteen hundred miles with restricted channels, the waterway will not be largely used. That is not a fair statement of the exact facts. The commission found there was less than sixty miles of restricted channels and with this exception the way was as open and free to navigation as the sea itself. They also found the delay on account of locks would only be from twelve to sixteen hours in the entire way from Duluth to Montreal.

Ocean going vessels now move up the Yangste River of China more than one thousand miles against a swift and treacherous current to obtain cargoes. They ascend the Amazon for more than fifteen hundred

miles and move a very considerable tonnage each year. One hundred million tons of traffic move every year through the Soo Canal. Experience has taught those familiar with lake navigation that the delays and dangers incident to passage through the limited length of restricted channels is insignificant and will have no appreciable effect on either rates or traffic.

Again you say "It seems conclusive that the movement now passing through the United States ports would not be diverted from existing routes in sufficient amounts to make the St. Lawrence route the factor that is contemplated by its advocates."

If your organization is correct in this, then the fears of Buffalo, New York, Philadelphia and Baltimore are groundless and the new way will do no damage to these ports.

The Buffalo papers do not agree with your position in this regard and recently stated, that "all export grain would go through to destination in the ship in which it was originally loaded and Buffalo get none of it if the waterway is constructed."

The first cargo of Douglass fir came into Montreal via Panama Canal in 1922. Eight ship loads went in last year, one of them going direct to Toronto. The president of the British Empire Lumber Corporation states that thirty-five million feet of lumber were brought from Puget Sound to Montreal in 1923 and that the saving in rates on a single cargo was $60,000.

A large part of Chicago's lumber comes from the Pacific coast. Is there any doubt that the same vessels that now sail from Pudget Sound to Montreal and even to Toronto, a voyage of thirty-five days, would take from two to five days longer to haul that cargo to the great cities on the lakes thereby saving from 25 to 50 per cent of the freight rate? Is there any doubt, too, but that they would take back a return load from the manufacturers of the lake cities? These eight ships

that brought lumber from the Pacific each took back a return cargo. The net result of the entire operation has been a saving of $12 a thousand feet, together with a handsome profit to the ships moving it.

With the possibility of the enormous saving in freight rates to the great empire surrounding the lakes, it is an insult to the intelligence and genius of the American people to think that with the waterway completed they will not develop ships to carry the traffic. We say to the people of New York that the construction of this waterway is just as essential to the great west as is the development of the New York harbor to your success and your development

Mr. Bush, your president, has said:

> If the Canal will save several cents a bushel in the cost of grain shipments to Europe, the Canal should be built—for this saving in transit will be added to the price realized by the farmer.

We are so certain that it will, that we are satisfied to stand or fall by the facts in support of our position. It is an admitted axiom of economics that the price of the entire crop is the price of the surplus. It is equally true that the price to the American farmer is the price obtained at the final market in Europe less the cost of reaching that market.

This is conclusively shown by the fact that when the Interstate Commerce Commission ordered a reduction on November 20, 1921, of grain rates in certain western sections, the bid prices for grain in the territory affected advanced the next day 3½ cents per bushel, the exact equivalent of the reduction in rate. The rate on grain from Duluth to Buffalo—one thousand miles—is from 2 to 5 cents a bushel, the lowest rate in the world. From Lake Erie to Montreal—three hundred and eighty miles—it is 7½ cents. From Buffalo to New York it is 7 to 9 cents. Grain rates to all European points are identical from New York and Mon-

treal and we are justified in comparing the cost from Buffalo to New York and Montreal after the waterway is completed.

Make any conclusion you like as to the cost of moving a ship already loaded from Buffalo to Montreal, (two days at the outside), and you must concede that the Montreal rate cannot possibly be 25 per cent of the present Buffalo-New York rate. This saving alone means at least 6 cents per bushel to the grain growers of the west.

It costs more to ship grain from Buffalo to New York, including terminal charges and loading on vessels, than the entire water haul from Duluth to Liverpool. If this waterway is completed to thirty foot depth and the Welland Canal open to navigation, all lake vessels can then go direct to Montreal. Ocean going vessels of thirty foot draft can go to Lake Erie and of twenty-four foot draft to the head of the lakes. Eighty per cent of all ocean-going vessels today are twenty foot draft and under. While the tendency is to build larger ships, yet last year Lloyd's register showed over 50 per cent of the new ships added to the worlds' fleets to be twenty foot draft and under.

The average rail rate is about 10.87 mills per ton mile, while the marine rate is 1.47 mills per ton mile. In short, the rail rate is seven times more per ton mile than the water rate.

Applying these rates to our domestic traffic, the present rail rate from Seattle to Duluth is $19.76 a ton, while the all-water rate based upon the mileage by water via the canal would be but $14.66 per ton or 25 per cent less than the rail rate.

Apply the ton mile water rates to the present rail rate and water distance between Duluth, Chicago, Detroit and other lake ports and New York, Boston and Atlantic seaports and the water rate would be less than one-half the all-rail rates in every instance.

There is no doubt but that with a free way open as contemplated by this waterway, lake vessels would at least go the three hundred and eighty extra miles in less than two days' time from Lake Erie to Montreal for from 1 to 2 cents a bushel and add from 6 to 8 cents to the value of every bushel of grain raised in the western country.

The commission found as a fact that it would save at least 5 cents a bushel, enough to pay the entire cost of the work in less than ten years.

We of the west supported the Panama Canal, while you of the east hesitated or opposed it. This canal has reduced more than half the rates between the east and west coasts, brought the lumber and raw materials of the west and the manufacturers of the east fifteen hundred miles nearer than they were before and greatly benefited the commercial interests of both the Atlantic and Pacfic coasts.

The advantage in freight rates during the past six years has more than doubled. The price of every bushel of grain raised in the west has been reduced from 15 to 20 cents a bushel on this account.

The Panama Canal has made more difficult for us any further freight reduction. The railroads in their struggle to compete with the canal and maintain their trans-continental traffic have built a rate structure that places the haul from coast to coast on a far less ton-mile basis than the inter-continental haul. When we ask for a reduction of rates we are told that it cannot be done without affecting the stability of the railroads. We know the struggle the northwestern roads are now going through in order to preserve their property, and we do not want to impair in any way the investments in these roads. The only hope for us in securing a better outlet for our traffic and an increased price for our commodities is through the construction of this waterway and the rate reduction that is certain to follow.

It is important that this work be started at the earliest possible moment. With the return of stable conditions in Russia, that great country, formerly the greatest exporter of food products in the world, will soon be back in the world market with her old-time surplus and make more difficult our situation.

But you say to us: "Long before the St. Lawrence project could be completed . . . the barge canal will be provided with facilities to take care of the traffic." The difficulty with this statement, from our viewpoint, is that the barge canal has never been a factor in moving grain from the west to the east.

In 1921 the barge canal only carried 13,736,000 bushels of grain, or but 9 per cent of the total grain traffic moving into New York harbor. The other 91 per cent moved by rail. During that same year 100,945,000 bushels of American grain moved by the lakes to Europe via Montreal. However advantageous this canal may have been to New York, it never added a single cent to the value of a bushel of grain raised in the western states. The ton-mile rate on the barge canal is and has always been in excess of the ton-mile rail rate where there was no possible water competition.

To illustrate: In 1921 the rate from Omaha to Chicago was 20½ cents per hundred pounds, or 8.2 mills per ton mile, while the rail and barge rate on wheat from Buffalo to New York, exclusive of elevation was 20½ cents per hundred pounds, or 10¼ mills per ton mile, or 25 per cent higher than the grain rate for the typical haul between Omaha and Chicago.

The farmers of the great west are not content to remain at the mercy of the Erie Canal, which up to this time has had no effect whatever upon grain rates and which has moved but an insignificant percentage of the total export grain of the United States.

Incident to the construction of the waterway and next only in importance to it is the fact that 1,465,000

primary horsepower will be developed. At the low rate of $20 per thousand per annum at the bus bar, the electrical power developed will pay the operating expense, interest on investment, and amortize the entire sum in less than fifty years. The power generated will take the place of fifteen to twenty million tons of coal per annum and extend far into the future the life of the coal fields of America. This will fit in with the great super-power lines now advocated for the northwestern part of the country and guarantee to New York and New England an abundance of cheap power as long as the waters run in the river. The advance in science in the development of improved means for the generation and distribution of electric power, the necessity of conserving our coal supplies, all make the development of electrical power one of the most important questions before the country. This phase of the work does not directly benefit the west but the New England states and New York will be benefited very greatly by the large addition of electric power.

It is important from a national viewpoint. Every year the construction delay means the irrevocable waste of twenty million tons of coal for the water that runs unhindered to the sea each year will furnish no power in the years to come.

We do not come to you today breathing threatenings and slaughter. We come pleading the justice of our cause. We come to say to you in kindness, yet with firmness, that this great work shall be, must be accomplished. It is manifest destiny. The American people will never allow the state of New York, and the ports of Philadelphia and Baltimore to prevent their free access to the sea. To use the words of one of your great citizens, George Roberts of the National City Bank: "New York cannot afford to oppose an enterprise which is supported by all the cities on the Great Lakes, by the state governments of fifteen states . . .

upon no other grounds than the route to the sea would be a rival of the New York route. That position is untenable and unworthy of the city of New York."

New York is so related to the United States and for that matter to the whole North American continent that anything which enlarges the productive capacity and adds to the prosperity of the interior inevitably benefits the city. We believe that the construction of this waterway will help every farmer in the northwest part of our country, that it will increase the prosperity of every city upon the Great Lakes, that it will return its cost many, many times over in the increased price of the agricultural products of the country. You cannot build up any part of America without helping New York. It is the financial center of our country. We believe it is destined to become the financial center of the world. To you we come for help and financial guidance in every great undertaking. Your banks are filled to overflowing with the money from the states vitally interested in this work. We come to you to insure our property and our lives, to borrow money to develop our resources and we gladly yield to you the leadership in everything of that kind. But we believe that the great power you possess is a power that comes to you by reason of your relation to the whole country, and carries with it an obligation to use that power not simply for the upbuilding of your own selfish interests, but for the advancement of the whole country. As you help the farmers of the northwest, you add to your own power and your own wealth.

REGION BENEFITTED[1]

Looking at the problem from a purely national point of view, we find that the region, likely to be benefited

[1] From article "The Great Lakes-St. Lawrence Deep-Sea Route." *Scientific American.* 131: 32. July, 1924.

by more direct trade with the British Isles and western Europe, contains a very industrious and progressive population of about forty-two million people.

The value of all farm property embraced within the tributary area amounts to nearly $450,000,000,000, more than 63 per cent of the total of such property in the entire nation, and four years ago, this region produced cereals, seeds and grains to the aggregate worth of $4,850,000,000. Something in excess of 50 per cent of the domestic animals in the country are to be found in the territory in question. Quite 49 per cent of the capital invested in mine and quarries in the United States is centered here and in 1920, 83.8 per cent of our soft coal was obtained from the bituminous fields of this favored portion of our land. The largest iron ore producing states are Michigan and Minnesota, both contiguous to the Great Lakes. Together, these two states provide over 80 per cent of the iron-ore output of the union. In 1909, 54.7 per cent of the paper made within our boundries came from some of the states that look to the St. Lawrence waterway for transportation relief. In conclusion, the money devoted to manufacture amounts to $19,000,000,000, nearly 43 per cent of that similarly ventured in the whole country; and of the total of 1,255,704,973 tons of freight traffic handling during 1920 on all class 1 railroads in the United States, fully 56 per cent had its origin in this zone.

SHALL WE BUILD THE ST. LAWRENCE WATERWAY.[1]

Yes

1. *Water transportation is much cheaper than transportation by rail.* For example, the Montana copper companies find it less expensive to ship to the Pacific

[1] From *Public Affairs.* 3: 30. September, 1924.

coast and via Panama Canal to eastern points, rather than direct by rail; and of the cost of moving wheat from Duluth to Liverpool, half comes in the haul from Buffalo to New York city.

2. *The New York Barge Canal will not solve the problem.* It will only accommodate barges, and for that reason is unsatisfactory. It means that goods must be loaded and reloaded, and this damages them.

3. *Buffalo probably would not be much harmed.* The good of the whole nation ought to take precedence in any event over that of any one city; but Buffalo is a great steel producer, and it also is a great milling center. These industries would not be affected. Montreal likewise fears injury to the profit of Toronto. The fears of eastern centers are probably exaggerated.

4. *There is a shortage of railroad equipment* that seems to increase rather than diminish as the years pass. There are never enough cars available to transport crops in the fall, particularly since coal is usually carried heavily at the same time. Congestion is the result. The predictions that the end of the war and of federal control would help the matter were not realized.

5. *The cheap fertilizer problem of the west would be solved* by a deep waterway. That is one of the great needs of the farming states, and high freight rates make it impossible to supply them at present. The allegations of opponents of the plan that we must soon stop exporting grain need not be taken seriously for in any event it must be carried to the eastern industrial centers and the canal would take it there.

6. *The proposed canal could accommodate boats large enough for ocean traffic.* Of one hundred and eighteen ocean going steamships through the Panama Canal, only thirty-six drew more than twenty-five feet; and of six hundred and three coastwise craft through that canal three hundred and sixty-four were of less than twenty-five feet draft.

7. Chicago can be the concentration point for western products just as New York is for the east. New York has now reached the position of being a congestion point rather than a concentration point.

NEGATIVE DISCUSSION

INLAND WATERWAY FALLACIES[1]

The psychology of the enthusiasm for inland waterways is a very interesting phenomenon. It rises again and again by means of some internal motive power, and with a fine disregard for the scientific findings of engineers. There is very little new that can be said on the subject. It has been hashed and rehashed for generations, but, like the Phœnix of antiquity, refuses to stay put, and must be discussed whenever it raises its head.

The last word upon the question of internal waterways was said in 1912 by Professor H. G. Moulton in a book called *Waterways versus Railways.* We can do no better than quote here a few passages from this work. Speaking of the movement which appeared during the first decade of this country, Professor Moulton said:

> The early craze for internal improvements in the United States is paralleled at every point by this second agitation for waterway development. . . . The remarkable conjunction of influences should be recalled, namely, the lingering glory of our waterways, the widespread movement for the conservation of all our natural resources the relation of waterways to the reclamation of flooded lands, to the development of water power, and to sanitation, the supposed remarkable cheapness of water transportation, the opposition to the monopolistic tendency of railways, etc.
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> The decline of waterways has continued to the present day in England and the United States and it has been checked in the countries of continental Europe only by the extending of government subsidies to the waterways. . . . There can no longer be any question, however, that so far at least as canals are concerned, the cost of transportation, all factors included, is almost universally much greater by water than by rail.
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> In the case of rivers, however, the situation may at times be somewhat different. But after all river transportation is usually

[1] From article by John F. Fennelly. *Commerce and Finance.* 15: 1127-8. June 9, 1926.

analogous to that by canal, for comparatively few of our streams are really natural highways of commerce. As a rule they are navigable for the purposes of modern transportation, in name only, rather than in fact. So long as the cost of canalization of a river amounts to forty, sixty, or a hundred thousand dollars a mile, it belongs in the same category as a canal. A river like the Rhine, whose banks are firm, whose gradient is gentle, whose water supply is constant, and the cost of regulation of which is almost negligible, may, indeed, be regarded as a *natural* avenue of commerce, but a river such as the Mississippi, with ever caving sides and shifting bottoms, with periods of alternating floods and droughts, the control of which is, in the opinion of engineers, a greater task than the building of the Panama Canal, is no more to be regarded as a natural highway of commerce than any artificial channel whatsoever. Our investigations have indicated that it is only in rare instances that river transportation can be made as economical as transportation by rail.

With this background in mind, we can proceed to an analysis of the waterway projects now agitating the nation. The first of these is the Mississippi River system. This scheme, according to Secretary Hoover, its leading protagonist, centers upon a great trunk waterway fifteen hundred miles in length up the Mississippi and Illinois from New Orleans to Chicago, and thence by lakes to Duluth. The proposed St. Lawrence waterway canal is another project for which the most extravagant claims have been made. The middle western farmers have been told that it will cut in half the cost of transporting their wheat to Liverpool and thus raise the price they receive at the farm. The cities on the Great Lakes visualize ocean steamers unloading in their harbors and they look forward to a time when the cities of the eastern seaboard will no longer dominate the ocean commerce with Europe. It is a pleasing picture for the middle western enthusiast to contemplate, but, if we look closely, we find that it has little relation to the actual facts.

Space does not permit any detailed analysis of this project, the cost of which is estimated all the way from $250,000,000 to $1,200,000,000. At the outset, however, we can discard the proposal to construct an all-American ship canal by deepening the Erie Canal as be-

ing too absurd to discuss. The cost to the taxpayers of New York state of maintaining the present barge canal between Oswego and Albany (a net annual burden which has averaged about $12,000,000 since 1919) should be sufficient to dampen the ardor for any further outlays in this connection.

The alternative is the proposed canalization of the St. Lawrence River from Ogdensburg to Montreal, a distance of approximately one hundred and twenty miles, part of which, however, includes Lake St. Francis and Lake St. Louis, these lakes being merely expansions of the St. Lawrence River. The difference in elevation between Lake Ontario and the St. Lawrence River at Montreal is 223.9 feet, which it is proposed to overcome by nine ship locks. Such ship locks will have various elevations of from nine to forty feet, or upwards. These do not include the seven locks of the Welland Canal with lifts of forty-six feet, nor the locks in the St. Mary's River of from sixteen to twenty feet lift.

This gives some idea of the engineering difficulties in the way of completing this project, but, as in the case of the proposed Mississippi River system, there is another obstacle of still more fundamental importance. Here again the voice of the shipper is conspicuous by its failure to register enthusiasm. The proponents of the plan seem to assume that it is only necessary to complete the canal in order to crowd the Great Lakes with ocean vessels. But that this assumption is far from the truth is convincingly stated by Frank C. Munson, president of the Munson Steamship Line, New York City. He says:

> The proposition to canalize the St. Lawrence for ocean going vessels is utterly impracticable from the shipping standpoint. Shipments of grain from Chicago to European ports, by the proposed canal, would require *twice the time* needed under the present system because of the low rate of speed with which ocean going ships could navigate the 1,130 miles of this restricted waterway.
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> The cost of transportation on such ships, through this canal, would be *at least double that* under the present practice of

sending grain by water to deep sea ports for transfer to large ocean going vessels. Only vessels of from three to four thousand tons could utilize a canal with a depth of twenty-five feet as proposed, and even these would be unable to use many of the harbors and connecting waterways of the Great Lakes, which at the present time are only twenty to twenty-one feet in depth.

In my opinion, any steamship company attempting to operate across the ocean and through the St. Lawrence Canal in competition with lines getting grain from rail or barge at New York or Montreal would be a losing venture from the start.

Again we see that "time is the essence of the contract," a fact that inland waterway enthusiasts are prone to forget, no matter how many times it is called to their attention. Ocean vessels are constructed for one purpose and lake barges for another, and it is impossible to make the former do the work of the latter without a great increase in transportation costs. The ocean steamer is a far more expensive vessel to construct and, therefore, cannot afford to enter into competition with the present economic system of barges. For instance, it is estimated that a ship could sail from the port of Boston to Liverpool and return in as short a time as an ocean ship could go from the Gulf of St. Lawrence to Duluth and return, although the distance across the ocean is many hundred miles greater than the distance from the ocean to the Lake Superior ports.

Another factor generally overlooked is that the St. Lawrence River is closed to navigation on account of ice and fog from five to six months every year. As this article is being written navigation on the St. Lawrence is just commencing, despite the fact that we are already into June.

Even if it could be shown that the canalization of the St. Lawrence would reduce materially the cost of transporting grain to Europe it would not necessarily follow that the American farmer would reap the benefit. In the first place, we must not forget that Canada would share with the United States the lower transportation costs. In the second place, it is undeniably true that

the United States is rapidly ceasing to figure as a leading exporter of wheat, while Canada is coming forward to take her place. Thus, even assuming that transportation costs could be reduced by means of the proposed St. Lawrence waterway canal, we might very well find that the money of our taxpayers had been spent for the benefit, not of the American farmer, but for those of our northern neighbor.

ST. LAWRENCE SHIP CANAL AND POWER PROJECT[1]

We have been nation-wide in our support of all such improvements within the confines of the United States whether such appropriations be asked for the Delaware, the Tennessee, the Cumberland, the Ohio, the Mississippi, the Missouri, the Columbia or for other rivers within the sovereign control of the United States. We believe that all approved projects ought to be supported and New York state, which pays 25 per cent or more of the entire cost of all such improvements, stands for them.

Furthermore, that state has built at its own expense of $175,000,000 and operates at its own expense of $1,000,000 or $2,000,000 annually its barge canal system, connecting the Great Lakes and the Atlantic Ocean, which system is free of tolls to all shippers, boat owners and others. That state at its own expense and without any Federal aid supplies without cost to the western producers a waterway twelve feet deep for vessels of two or three thousand tons capacity from Lakes Erie and Ontario to the sea. Its capacity is twenty million tons annually or more than twice the ex-lake tonnage for coastwise or trans-Atlantic shipment.

[1] From address by Henry W. Hill, president of the New York State Waterways Association, before the National Rivers and Harbors Congress, December 9, 1925. *New York State Waterways Association. Report.* 1925: 101-6.

The New York barge canals are capacious enough to transport all the water borne tonnage passing either way between the Great Lakes and the sea and are open as long as the Great Lakes are navigable. They were built after well matured plans had been prepared by notable waterway and canal experts thoroughly familiar with the conditions existing and purposes to be served as the most practical, serviceable and economical type of canals that could be constructed between the Great Lakes and the Atlantic Ocean. They are wholly within the territory of the United States and subject at all times to the exclusive control of New York state and Federal government.

For the five year period from 1910 to 1915 the average cost of transporting a bushel of wheat from Duluth via the Great Lakes, the New York barge canals and the Atlantic Ocean including all charges for lake, canal and ocean freights, for insurance, elevators and storage was only 10.73 cents per bushel, a rate so low that it is not likely to be lowered on cargoes passing down the Great Lakes and through the tortuous, befogged, iceflown channels of the St. Lawrence River and Gulf and over the north Atlantic, a region of icebergs, all of which make that route hazardous and entail high insurance. Furthermore ocean going vessels have greater dead weight than do lake vessels, cost more in proportion to their displacement and are more expensive to operate than are Great Lake vessels. Francis C. Shenehon writing in favor of the project of the St. Lawrence waterway estimates the rate on wheat from Duluth to Liverpool via that route would be about 10 cents per bushel, so it appears that there will be no greater economy in transportation charges via the St. Lawrence route than there was from 1910 to 1915 via the New York all water route.

Furthermore, the distance from the stormy Gulf of St. Lawrence to Chicago and Duluth is more than

twenty-two hundred miles and most of that distance is through restricted tortuous channels that must be deepened and rectified involving millions of dollars on the part of the United States. Lake Superior is six hundred and one feet above sea level and can only be reached by ocean vessels steaming slowly through narrow channels and locking up through nine locks in the St. Lawrence River, seven locks in the Welland Canal and the two locks in St. Mary's River. The lift in several of such locks is over forty feet and in some of them forty-seven feet, thereby imposing much delay to costly ocean going vessels in their passage between the Atlantic Ocean and the upper lake ports and so increasing the expense of operation of such vessel far above the expense of the operation of such vessels on the high seas between ocean ports. These and other unavoidable matters of expense incident to the navigation of the St. Lawrence River, the Great Lakes and their connecting channels by ocean going vessels will necessarily swell the cost of transportation of grains and other tonnage far above the freight rates prevailing on the Great Lakes. Vessel owners and navigators familiar with the proposed St. Lawrence ship canal and power project and the difficulties and hazards in navigating that route do not consider it practical or economical, even though from an engineering viewpoint it be possible of construction and operation.

The initial cost, with hydro-electrical development of 1,464,000 horse-power at the Long Sault Rapids only, of the proposed ship canal for vessels of twenty-five feet draft was reported by the International Joint Commission to have been estimated by its engineers at $252,728,200. To make a canal for vessels of thirty feet draft the engineers estimated $17,986,180 should be added and to develop the maximum of four million one hundred thousand horsepower with a twenty-five

feet draft canal, it would cost $488,211,208 and with a thirty feet draft canal, it would cost $506,197,300. Colonel Hugh L. Cooper, believed to be the best authority on such problems in this country, has estimated the cost of the St. Lawrence waterway and power development project approximately at $1,250,000,000, which is equivalent to the total of all the appropriations made by the Congress of the United States for river and harbor improvements of which there is any record. In other words, the advocates of the impractical and visionary St. Lawrence ship canal and power project would have the United States obligate itself to pay toward that project, uneconomic as it will be and built mostly in Canadian territory and under its sovereign control, half as much money as it had expended in a hundred years on its own waterways. And that expenditure is to be made at the expense of appropriations needed to complete approved waterway projects in this country for the largest appropriation made by Congress for river and harbor improvements was that of 1923 of $56,589,910, plus $456,850 for surveys and examinations. Ordinarily Congress appropriates less than $43,000,000 for such purposes so that the length of time cannot be estimated that will be required to complete the Ohio River improvement begun fifty years ago, nor the improvement of the Mississippi, nor the improvement of the Missouri, nor that of the Tennessee, nor that of the Cumberland, nor that of any other river in this country, if $125,000,000 are to be expended in the St. Lawrence River project, nine-tenths or more of which is in Canada. The people of this country will not stand for such appropriations for waterway projects in both countries, so decision must be made as to which is to be recommended, American money for American waterways or American money for Canadian waterways. If both can't be had, which is to be preferred?

The Buffalo Chamber of Commerce, which I have

the honor to represent and which has given much consideration to the matter and which for years has been one of the active waterway organizations of the country, opposes the St. Lawrence project for reasons already stated and for other reasons not stated for want of time, such as the burden of taxation for that project, additional to the state indebtedness of approximately $200,000,000 heretofore created and, or appropriated for barge canal and barge terminal improvements, one-twentieth of which has fallen on Erie County, including the city of Buffalo. That city has already expended $5,000,000 and is planning to expend $5,000,000 more in its outer harbor, thus totalling $10,000,000 in its harbor improvements, in addition to $10,000,000 or more expended by corporations and others. That one county in New York state, wherein I reside, has and is thus contributing to waterway improvements altogether about $20,000,000 or as much as the state of Illinois is expending under its bonded authorization in the Illinois River improvement.

Some other counties in the state of New York have contributed larger amounts and Greater New York is not only paying the larger part of the state indebtedness incurred for the construction of its barge canal system of approximately $200,000,000 but it is also obligated to pay the greater part of the port development which involves an expenditure of $500,000,000. That is additional to the many millions already expended in harbor development. It may thus be seen that New York state has contributed to canal and terminal construction, to port developments and to river and harbor improvements hundreds of millions of dollars and its taxpayers strongly oppose the expenditure of hundreds of millions of dollars in constructing a ship canal, that experts assert will be of little or no value and in building power plants most of which are to be located in Canada. New York state, overburdened as it is for waterway projects,

protests against the expenditures of such vast sums of money as will be necessary to carry to completion the St. Lawrence seaway project, which experts say will serve no transportation purpose.

There are few, if any, shipload cargoes to be brought from any European port to any Great Lakes' port, so that westbound vessels to such ports will have no paying freight to offset heavy expenses of operation. Such vessels must steam slowly a thousand miles up through the restricted channel of the Gulf and River St. Lawrence where scores of shipwrecks have occurred to the Lachine Rapids locks and lock up through two locks forty-seven feet to Lake St. Louis and thence steam sixteen miles further through a restricted channel to Lake St. Francis and then lock up through two locks eighty-three feet and thence through the restricted channel of Lake St. Francis, which must be dredged, and on up forty-three miles to the Long Sault Rapids and thence in a distance of forty-eight miles lock up through three locks, ninety-two feet to Chimney Point, and thence steam on up through a restricted channel, some of the way amid the Thousand Islands, sixty-five miles to Lake Ontario, approximately one hundred and eighty-two miles from Montreal and two hundred twenty-three and nine-tenths feet above the St. Lawrence River level at Montreal, and thence on through Lake Ontario and up through the seven locks of the Welland Canal three hundred and twenty-eight feet into Lake Erie at Port Colborne, which is approximately one hundred and eigthy-five miles from the outlet of Lake Ontario and approximately thirteen hundred and seventy-three statute miles from the Gulf of St. Lawrence and eight hundred and fifty-two miles from Fort William and nine hundred and seventy-four miles from Duluth and eight hundred and seventy-six miles from Chicago. Lake Erie is a shallow lake and underlain by reefs and shoals and not easily navigable by deep draft

vessels. The Detroit, St. Clair and St. Mary's rivers are not navigable by ocean going vessels and their channels must be rectified and dredged before ocean going vessels can pass through the same. The expense of such additional dredging in the Great Lakes and connecting channels will run into millions of dollars. Mr. Shenehon has much underestimated such expense, because vessels of twenty-five or thirty feet draft need channels of twenty-eight or thirty-three feet depth when going at full speed, otherwise there is great loss to costly vessels in time.

Furthermore, there are no harbors on the Great Lakes that will admit of navigation by ocean going vessels of twenty-five or thirty feet draft, all of which harbors and the docks or piers within which must be dredged out before ocean going vessels can discharge and receive cargoes thereat. The expense of all such improvements would run into millions of dollars. That expense would be thrown upon the United States and the ports where the same was done. While a vessel is making its voyage from the Gulf of St. Lawrence to Chicago, Fort William or Duluth, a distance of upwards of twenty-two hundred miles up through the channels hereinbefore described and receive a cargo at anyone of those ports and then return to the ocean through the same circuitous route subject to long delays, such vessel could make possibly two voyages across the Atlantic and return where it would have cargoes both ways, thus showing the advantages of ocean navigation over those of the navigation of the gulf and river St. Lawrence and the Great Lakes.

It is quite generally believed that the energizing force back of the St. Lawrence project is not agricultural relief but hydraulic power. That belief is confirmed by the interest taken in the project by the representatives of the electrical power companies and the elaborate plans proposed for the development of power above and be-

low the international boundry. The estimated cost of such development may exceed the cost of the channel and locks for navigation purposes and that is quite probable since the decision of the Privy Council holding that the proprietary rights along the St. Lawrence waterfront are under the Canadian provinces rather than under the Dominion government and that the vested rights of the riparian owners in the lands under such waters may not be divested without compensation therefor being made to such owners.

Though Congress may make appropriations of public funds for river and harbor improvements within the confines of the United States, what constitutional authority is there for appropriations for constructing a ship canal nine-tenths of which is in Canada or building power plants even in the United States, much less in Canada? It may be said that the power is incidental to the navigation scheme. Is that true? Are not the power features the dominating parts of the entire project? Read the reports of the engineers and of the International Joint Commission on Boundary Waters and from those reports may be seen that the St. Lawrence project is largely a power scheme, stalking under the cloak of an alleged navigation project, to wrest from the state of New York its proprietary rights and from its citizens the vested riparian rights in the St. Lawrence River and in its flowing and power producing waters and the lands under those waters without making compensation to such owners therefor. Under the commerce clause of the Federal Constitution whatever lands in the bed of a stream necessary to make it navigable may be taken without compensation but the lands along the state of New York and the flowing waters over them are wholly unnecessary for a canal of twenty-five or thirty feet depth on the north side of the river wholly in Canada. But such is the claim and that is the camouflage being used to divest New York and its

people of their vested property rights without compensation and against their will. If the plan works, other waterfront properties and water rights along rivers wholly within the territory of the United States and possibly within some one state may be taken in a similar manner. With the St. Lawrence grab as a precedent, what state or people are able to withstand the far reaching and powerful tentacles of such waterpower corporations as those seeking to get control of the water powers of the St. Lawrence through the guise of a navigation project? The water powers of that river can and will be developed south of the international boundary under the supervision of the state of New York and north of that boundary under the supervision of the provinces of Ontario and Quebec and all of such power will be distributed and used as it should be without the intervention of an International Commission to traffic in as is frequently done by political commissions. The state of New York and the provinces of Ontario and Quebec are competent to supervise, develop and distribute all the electric power that may be generated in the St. Lawrence River and they will do so, if permitted, as economically or more so than that can be done by the United States and the Dominion of Canada under an International Commission.

Therefore from whatever viewpoint the matter be considered, the St. Lawrence ship canal and power project with all its international complications and other objectional features ought not to be undertaken by this nation with other problems to solve and other waterways to improve of more direct interest to the people of this country. Our slogan should be American money for American waterways.

The advocates of the St. Lawrence ship canal and power project include many groups, such as the paid propagandists, employees of water power corporations and their political followers, subsidized journals, some

engineers and many others, who look to that as a public work of such magnitude as to require the services of and afford employment for themselves and others for years to come. What matters it to them, if the United States sink millions in the wasteful waters of the St. Lawrence? The Federal government squandered hundreds of millions of dollars in useless war equipment and in impractical military ventures. Why stop now? Gigantic combinations want the power that may be developed in the St. Lawrence. They care not for its navigation. Let the carnival of wasteful expenditure of public funds go on. Put upon the over-burdened taxpayers an additional $125,000,000 more. They are unsuspecting and may never know that the St. Lawrence ship canal and power project is not approved by navigators, vessel owners, shippers, transportation agencies and others best qualified to pass judgment upon it. The taxpayers do not know that by the time the St. Lawrence ship canal, if undertaken, is completed in ten years from its inception, that there may be no surplus grains in the United States to be shipped to foreign markets. Nor do they know that a bushel of grain eventually may be shipped from the ports of the upper lakes to European ports via the New York canal route as cheaply as by the proposed St. Lawrence River route with its high insurance rates on cargoes and with the extra operating expenses of vessels via that route. Nor do they realize that the St. Lawrence route is frozen and absolutely closed to navigation five or six months of the year and that it is iceflown and befogged for some other months of the year and that in the Gulf of the St. Lawrence and in the north Atlantic are icebergs in countless numbers and on account of vessels that have been wrecked in the Gulf of St. Lawrence and the St. Lawrence River, mariners and others have named that region "the graveyard of the Atlantic." All these things and many others may be unknown to the

taxpayers, who are being made to believe that in some way and somehow they are to be benefitted by canalizing the St. Lawrence River, nine-tenths of its flow in a foreign country, which river is frozen five months of the year and not always serviceable during the other months of the year.

Owing to such barriers to navigation, the St. Lawrence River cannot be said to be the natural outlet for the products of the United States, for such barriers are due to the geographical location of the river and to climatic and physical conditions, which neither art nor industry can remove.

As a waterpower project, four-fifths of which is to be developed in and rightfully belong to Canada, which that dominion may not control, owing to the recent decision of the Privy Council, and which in no event is it likely voluntarily to cede to the United States, there is no economic or other well-grounded reason to warrant the United States in appropriating millions for its execution. That may be left to the Provinces of Ontario and Quebec, which own four-fifths of the waterpower rights and to the state of New York which owns one-fifth to develop at their own expense respectively as their interests may appear.

It has already been shown that the St. Lawrence ship canal as a navigation project is impractical and will afford no relief to traffic conditions in the west and that the same is unjustifiable and there is no warrant under the Federal Constitution for the United States to spend millions in its construction in foreign territory, over which they have no control. They did not do so at Panama, but acquired the canal zone before constructing that canal. Canada will never cede its territory for the proposed St. Lawrence ship canal, and the United States will have no control over such waterway if constructed, and therefore they ought not to contribute to its construction.

From the facts already stated and others which there is not time to state, it must be evident to all who have studied the matters involved and have considered them in their physical, commercial and international phases, that the proposed St. Lawrence seaway project, or better known as the St. Lawrence ship canal and power project, is uneconomic, unconstitutional and un-American and ought not to be undertaken by the United States.

ST. LAWRENCE DEVELOPMENT SCHEME[1]

The economic side is the crux of the whole situation, and the least understood. It is common to quote water rates as being much lower than rail—this is unquestionable—but the fundamental reason for this is that the railway has to set aside from its earnings a considerable sum for the maintenance of its roadbed, track and bridges, and another very large sum for interest on its initial cost.

The steamer is concerned with none of these things in the case of our Canadian canals, but only with the vehicle itself and its crew, corresponding with the rolling stock, motive power, and train service of the railway. The maintenance and capital charges are paid by the state out of ordinary taxation, and you and I, resident in Toronto, the lumberman in northern Quebec, or British Columbia, the fisherman in Nova Scotia, and the miner in northern Ontario, all contribute to the gains of the Saskatchewan farmer, due to lower rates by water carriage. I will not say that the former will not gain also indirectly at any rate, by improvement in transportation facilities, but to what extent and how far, is it reasonable and fair that they should contribute? Let us face the problem squarely and not evade it, for it is this evasion and indifference to underlying economic principles which pave the way to national bankruptcy. When

[1] From article by Henry K. Wicksteed, Toronto. *Canadian Engineer*, 46: 325. March 11, 1924.

there came an agitation not long ago for reduced railway rates on the railways, it was stoutly and properly maintained that the later must earn enough to enable them to pay their way, and the contention was admitted as a just one. I am by no means an opponent of water transport by ocean, lake, or river. The navigation of lakes Superior, Huron and Erie has made possible as the railways alone could not have done, the tremendous development of the iron and steel industry in the United States, but we must remember that these were connected up at a ridiculously small expenditure of money, a little over one mile of actual canal, with a single lock, and a very few miles of improved channel gave an even thousand miles of open navigation, with a branch of four hundred miles to Chicago. The Panama Canal is a conspicuous success, but here again it connected oceans thousands of miles across. So did the Suez Canal. The Panama Canal is paying its way and no one grumbles about the tolls which enable it to do so. In the case of the St. Lawrence, we have to face an almost continuous artificial channel from Montreal to Morrisburg, one hundred miles, in order to reach the lowest of the Great Lakes, and we have still to face the climb up the Niagara escarpment by means of the unfinished Welland Canal. The cost of this one hundred miles is estimated at $250,000,000 at least. With the Welland and the improvement of the principal harbors of the lakes to a twenty-five foot scale, some of the connecting channels in the Detroit, St. Clair and St. Mary's Rivers, and the deepening of the canal at the Sault itself, we may count confidently, I think, on a minimum of $500,000,000, and this for a navigation on what is today a second rate scale of twenty-five feet, and for only six or seven months of the year. In this last clause we have the overwhelming difference between the St. Lawrence project and the Panama and Suez Canals. They are open to the greatest ships of the world for three hundred and sixty-five days in the year, and we have repeated assurances from men of experience, men who

handle waterborne commerce, that the ocean steamers will not find it profitable to make the long climb of nearly six hundred feet to Chicago and Milwaukee and Port Arthur and Duluth from Montreal, even if the opportunity is offered them. I leave this consideration to the vessel men themselves to wrangle out, merely pausing to point out that the latest argument that a visit to fresh water is good for sea-going vessels to enable them to get rid of marine growths, falls rather flat because they are already in fresh water at Montreal, and even at Quebec and Chicoutimi. I think it is unquestionable that the lake type of steamship with its lighter build and lower power, greater carrying capacity in proportion to total displacement, and unequalled facilities for handling the freights peculiar to the Great Lakes, can handle the traffic of the lakes themselves much cheaper than the ocean freighters, which tends to offset the cost of transhipment, in part, at any rate.

NEW YORK STATE BARGE CANAL[1]

Because of the importance of the barge canal to the people of the state, and the widespread agitation for a ship canal to connect the Great Lakes with the Atlantic, I respectfully submit the following report. One way of writing a report is to exaggerate favorable points by a liberal use of laudatory adjectives and to minimize or suppress everything detrimental to the subject; the other method states the facts, pleasant or unpleasant. This second method is here used, all definite statements and all figures given may be verified from official records.

Present Traffic Conditions

That the traffic carried on the barge canal has fallen short of expectations cannot be denied. The canal has

[1] From special report to Alfred E. Smith, governor of the State of New York, by Frederick Stuart Greene, superintendent of public works. 10p. New York State Department of Public Works. Albany. February 26, 1926.

a theoretical annual capacity of twenty million tons. In 1919, the first year after the canal was opened throughout its length, 1,238,844 tons were floated; last season, 2,344,013 tons were carried. This increase has not been sufficient to prove the canal an economic success.

The cost of the canal during 1925 was:

Maintenance and operation	$2,981,841.26
Capital charge	6,137,495.08
Permanent betterments	1,092,051.52
Claims paid	722,175.89
Gross cost	$10,933,563.75
Less receipts	359,936.91
Net cost to the taxpayers	$10,573,626.84

The greater part of the tonnage was bulk freight—grain, sulphur, salt, etc.—which is carried at low rates both by water and rail; a fair average rail rate on commodities carried by canal from Buffalo to New York, the longest haul, is $3.70 per ton. In 1925 it cost the state $4.51 per ton for all freight floated on the canal, regardless of the length of haul. From these figures it is evident that it would have been cheaper for the state if all the freight carried on the canal had been put on railroad cars and the state had paid the freight bills.

It should be remembered, however, that it would not have cost the state one penny more for maintenance and operation during 1925, had the canal carried its full twenty million tons capacity; in which event the per ton cost would have been only 52.8 cents and the canal, thereby, a benefit to the taxpayers.

It has been testified that the canal saves the people of the state $50,000,000 annually in "depressed" rail rates. This has not been proven to my satisfaction. The old Erie Canal undoubtedly served to "depress" rail rates; this, however, was before the existence of the two rate-regulating authorities: the Interstate Commerce and the Public Service Commissions. Having these regulatory bodies, the questions naturally arise:

1. Would these authorities have allowed rail rates to be increased $50,000,000 a year, if the canal were not built?

2. Are states, lacking canals, overcharged by the railroads $50,000,000 a year, or in proportion, according to the amount of freight carried?

3. Is not a club, costing $10,500,000 a year, an expensive weapon to hold over the heads of the railroads?

The barge canal is maintained and operated free of tolls to all vessels, American and foreign. The state also: (1) Permits canal vessels to moor at piers and use all terminals free of cost: (2) Rents loading and unloading equipment at less than the actual cost of operation: (3) Allows canal vessels to tie up during the winter at terminals and basins, free of cost: (4) Maintains a traffic bureau which gives free service to both shipper and boat owner: (5) Maintains, during the navigation season, a daily telegraph service by which operators are informed of the position and progress of their boats through the canal: (6) Maintains special signal service on Lake Oneida to warn vessels of storms: (7) Maintains three tugs to aid boats, two on Lake Oneida, one on the canalized Hudson River. In spite of all this, however, the canal is only floating about one-tenth of its tonnage capacity.

Why the Canal Is Not More Used

If twenty persons, knowing the canal, were asked why it is so little used, probably twenty different answers would be given; but the fundamental reason is ice —the canal is closed by ice for five months each year. Were the canal, even as now constructed, open throughout the year, it would be crowded with traffic.

And yet the Canadian-St. Lawrence canals, also icebound, have increased their business until their theoretical capacity is almost reached. They are not ship canals in the strict sense; they have only fourteen feet of water

over the lock sills, as against our twelve feet; their locks are not as modern, not as long, nor any wider than ours. Nevertheless they carry not only a greater tonnage, (6,206,988 as against our 2,344,013 in 1925), but they have had greater yearly increases.

Why did the smaller, if slightly deeper, St. Lawrence canals carry 3,776,122 more tons in 1925 than did the barge canal?

Why, in 1925, did eight hundred and three United States vessels pass through their canals and 2,026,510 tons of American products go to the Port of Montreal?

In the last eight years, (1918-1925), 14,575,180 tons of freight which originated in the United States went through the Canadian canals, every pound of which should have been floated on our own canal.

The answer is that the St. Lawrence canals are not hampered by fixed bridges. The immovable bridges over our canal permit a clearance of only fifteen feet; this limits the free board of hulls and the superstructure of all vessels. Our fixed bridges block boats with normally high stacks and any kind of masts; they limit the height of pilot houses and the captain's bridge to such an extent as to seriously interfere with the proper handling of large crafts. Finally, and this is the vital point, they necessitate the building of a special type boat which cannot be operated advantageously on any other body of water. The practical business man will not invest large sums in a boat of comparatively small tonnage which, because of its special design to fit our canal, lies idle five months out of the twelve.

The Erie Canal succeeded in spite of ice and low bridges, but the investment in the mule-towed canal boat was so small, and winter carrying charges so little in comparison with the business done, that they could afford to remain idle during the closed periods; and the fixed bridges did not hamper them at all. It is a different financial problem when a modern, self-propelled vessel, costing from $100,000 to $250,000 must lie idle

five months, under heavy interest charges, insurance and a subsidy to both engineer and captain.

The New York State Barge Canal is such an important transportation factor in this country that, whether or not it is a failure, it should be continued. All maintenance work necessary to secure and hold proper channel depth, to protect the banks, to keep up the mechanical equipment and to improve navigation conditions generally, should be vigorously carried on. And the taxpayers of New York state should continue to bear these costs until this nation is awakened to the fact that a condition exists which threatens American commerce; that a remedy is vitally urgent, and that the remedy lies in converting the barge canal into a ship canal.

That the Great Lakes, at no distant date, must be connected with the Atlantic by a ship canal is inevitable. The bickering, which began as far back as 1812, between New York and some of the lake states, as to whether the St. Lawrence or an American canal should be built, was, and is, a futile waste of energy. The ever growing lake commerce and the increasing population of northwest Canada, may eventually demand both canals. But it is hard to understand why the United States should not leave the Canadian canal to be constructed by that country and devote its own resources to building the better American waterway from Lake Ontario to the Hudson River.

During all the arguments for and against a ship canal to the lakes, the opponents have stressed the point that ocean vessels will not make the inland journey to the lakes; that, should they do so, they could not there compete with the cheaper built lake carriers. So far as the necessity for a ship canal is concerned, it makes no difference whether or not ocean steamers go to the lakes.

The reason for the astonishing growth in business at the port of Montreal is because Montreal is the junction point between lake and salt water tonnage; there lake steamers transfer cargo to ocean crafts. If the St.

Lawrence canals were handicapped by fixed bridges, this transfer would have to be made at Lake Erie, where freight would be discharged from lake steamers to canal boats and Montreal would then be in the same freight position as Albany is now.

When the upper Hudson is deepened and a ship canal is built to Lake Ontario, Albany will become the American junction point for fresh and salt water freight. And judging from the history of Montreal, it is reasonable to assume that the port of Albany would not only keep pace with Montreal but would rapidly catch up with and surpass the Canadian port. This prediction is based on the advantages of the American route:

1. The distance from Lake Ontario to the sea via Oswego and Albany is three hundred and forty miles, as against eleven hundred and eighty miles via Kingston and Montreal.

2. From Montreal to the sea is one thousand miles; from Albany to the sea is one hundred and fifty miles.

3. The St. Lawrence River and the Gulf of St. Lawrence are subject to frequent fogs; on the Hudson, fogs are rare.

4. The St. Lawrence route meets the sea at a latitude where not only fogs but icebergs are prevalent; the Hudson River ends at New York Harbor, where the ocean is free from icebergs and rarely hampered by fogs.

5. The American route would serve a more thickly populated area, providing greater sources of freight, both farm and manufactured products.

From all the above, the following conclusion may be drawn: Since the fixed bridges and twelve feet of water over our lock sills make it impossible for any but specially designed boats to use the canal; and since capital will not invest in boats to lie idle five months out of twelve; we must look to lake vessels for any substantial increase of tonnage, and to that end convert the barge canal, from Oswego to Albany, into a ship canal with bridges that lift or swing.

Because of the magnitude of such a project, and as the great bulk of canal business is now and will continue to be interstate, such a ship canal is rightfully a national undertaking. The state of New York should—not selfishly—but in the interest of the whole country, do everything in its power to bring about the building of this canal by the Federal government.

For the government to build this canal, establishes no new policy; it has already bought the privately owned Maryland and Delaware Canal which is being developed to have eventually a depth of thirty feet. A canal from Lake Ontario to the Hudson, in spite of being closed during the winter, would in all probability float more freight than a coastwise canal connecting Delaware River and Chesapeake Bay.

In the construction of the Albany-Oswego ship canal, much of the present construction of the barge canal could be utilized. It is probable that the Visscher's Ferry dam and the movable dams on the Mohawk, which cost this state $5,302,000, and which to replace would cost twice that sum, could be retained. Many of the locks could be left in place and used to pass the smaller boats, thereby saving lockage water. Our present lock power houses could be used to operate the larger ship canal locks. The Delta dam, which cost $894,571, and our storage reservoirs would be useful. In short there are many millions of dollars in barge canal structures and work that would prove a saving in the cost of building the proposed ship canal.

In the barge canal, New York has much to offer the nation, but in any agreement wherein the barge canal from Oswego to Albany is turned over to the government, it should be stipulated that the Champlain, the Seneca-Cayuga and the Erie Canal west of Oneida Lake shall be retained as feeders to the larger waterway.

A ship canal from the lakes to the Hudson is more than a desirable project; unless this country is content to remain inert and see American freight shipped in ever

increasing amounts through a foreign port to be carried on the seas in foreign vessels, an American ship canal is a necessity.

ALL-AMERICAN WATERWAY[1]

For more than a century and a half this country has talked of connecting the Great Lakes with the Atlantic Ocean by a ship canal. One hundred years ago this desire was partially met by the construction of the old Erie Canal, and it is doubtful if any transportation project was ever a greater success.

Up to 1883, the year that tolls were abolished, the Erie Canal together with its branches, chiefly the Oswego Canal, has repaid the state not only all it had cost for construction, operation and maintenance, but it had turned in the handsome profit of $43,599,177 over and above these charges.

What was of greater benefit, however, than mere dollars, the Erie Canal fostered the growth of that great industrial zone which, with its chain of cities and factories, extends from Buffalo to Troy and on down the Hudson River to end at Greater New York. When the railroads appeared they followed this well-established trade route, so that as a traffic line to the west it was not only the first in point of time but it has remained the first in importance in this country.

As the population of our middle and western states increased, lake commerce grew in proportion and the agitation for a deep waterway between our inland seas and the ocean became more pronounced. Then, without warning, came the World War and with it the necessity for transporting hundreds of thousands of tons of supplies from our middle and western states to the Atlantic seaboard, and for the first time it was proven beyond

[1] By Alfred E. Smith, governor of New York State. *New York Times.* 75: 27. March 16, 1926.

dispute that our railroads were not adequate to meet such an emergency.

To relieve the overburdened railroads, the Federal government hastily designed and built barges to be used on the New York State Barge Canal, and though boat operators disagree as to whether or not these vessels were of the proper type none deny that they did carry many tons of bulk freight and that they did serve to relieve rail congestion.

The war, having clearly shown the necessity for a ship canal, both political parties heeded the warning and have given their promise to the American people that such a canal will be built.

A ship canal, however, is not needed solely to meet emergencies. Our five Great Lakes make up the largest body of inland waters in the world; the states bordering them are large in area, population and production. These lake states with the more westerly ones, North and South Dakota, Nebraska, Iowa, Kansas and Missouri, now produce an enormous tonnage of both agricultural and manufacturing products. And as the years go by this output of farm and factory will surely increase and the demand for the cheaper water transportation to the markets of the world will become more insistent.

In the discussion of a ship canal from lakes to ocean, I shall deal with the subject solely as a transportation proposition divorced from the question of hydro-electric development, which is an entirely different problem, one which should stand by itself and not be permitted to befog the question of transportation.

There exists three possible routes for such a canal: One from the east end of Lake Ontario through the St. Lawrence valley to the Gulf of St. Lawrence and thence to the sea. A second route leaves the St. Lawrence River at Lake St. Francis, runs through Canadian territory to Lake Champlain, thence to the Hudson River and the sea.

The third route leaves Lake Ontario at Oswego, passes through the Mohawk valley to the Hudson and thence down the Hudson to the sea. It is this last, the so-called American route, that I believe should be built.

It is natural and proper that every American should wish the supremacy of American ports continued; to accomplish this, a ship canal to the lakes through American territory is a necessity.

The Canadian-St. Lawrence canals in 1900 carried only 1,309,066 tons; in 1925 their business had increased to 6,206,988 tons. During the last eight years (1918-1925) the St. Lawrence canals carried 14,575,180 tons of freight that originated in the United States. Every ton of this should have been carried on an American canal to or through an American port.

The American canal will not only provide the cheaper water rates desired by our western states, but it will make Erie, Pa., Cleveland, Toledo, Detroit, Chicago, Milwaukee, Superior, Duluth and other lake cities seaports, having the shortest water route to every Atlantic port and to West Indies, Central and South American markets.

I say these lake cities will be seaports in spite of the contention so often heard that ocean ships will not go to nor navigate upon the lakes. The large and ever increasing tonnage handled at Montreal proves that so far as the success of a ship canal to the lakes is concerned it is not necessary for ocean steamers to enter the lakes at all.

What is necessary is to provide a junction point where fresh and salt water tonnage may be exchanged, a port where the lighter-built lake steamers may meet and transfer cargo to the ocean vessel.

That the American route is practical from the engineering standpoint has been certified by the army engineers who recently reviewed the exhaustive report of the special board which surveyed and reported on this route in 1900. To my way of thinking, the advantages of the American route are so evident that only a few

arguments are necessary to convince any one not having some personal advantage to gain through the Canadian route that the American route is the one for this country, at least, to build.

The distance from the lakes to the Hudson is only one hundred and sixty-six miles. It has been argued that canal navigation is too slow to meet modern traffic requirements, but a rate of five miles an hour is admitted to be practical on the canal proposed; this means that the actual canal journey can be made in thirty-three and one-half hours.

The trip on the broad and deepened Hudson to Sandy Hook is one hundred and sixty-five miles. Here steamers can run at full speed, let us say ten miles an hour. The entire trip, then, from lakes to ocean can be made in fifty hours.

The American route runs through territory seldom troubled by fogs and ends at New York harbor, where the ocean is free from the menace of icebergs.

Finally, the success of any line of transportation depends upon the tonnage carried, and as the American canal will serve a region that, per square mile, produces more potential freight than any other territory in the country, this canal should, and in all probability will, carry more freight than any other inland waterway.

To say that a ship canal to the lakes would be an aid to our national defense in time of war is to state a fact as obvious as that rations are needed for troops. In recent letters to the chairman of the Rivers and Harbors Committees of Congress both the Secretaries of War and of the Navy so declared themselves.

It is of small moment that, following the visit of certain politicians to the White House, the wording of their first letters was somewhat modified; the fact remains that the Secretary of War stated:

> In the event of a great war the transportation of the agricultural products and raw material of the Middle West to the Atlantic Seaboard and to the thickly populated industrial areas

of the Eastern and New England states would impose a great burden on the railroads. The probable resulting congestion could be relieved by the further development of the waterways connecting the Great Lakes with the Hudson River.

And the Secretary of the Navy said:

I am of the opinion that the proposed all-American deeper waterway, connecting the Hudson River with the Great Lakes, would be a very important addition to the transportation system of the country and would be, therefore, an important asset to the national defense.

In my consideration of this subject, that phrase so convenient to the vacillating, "an open mind," has no place.

I am convinced that a ship canal from lakes to sea has become a necessity to the commercial needs of our country; that it will some day be built is inevitable; that the promise of both our major parties should be kept; that the time to fulfill that promise is now; that the route of the American canal, following the long established line of traffic, is the best one to build and that an American canal is the only one for which American capital should be spent.

ARGUMENTS AGAINST THE ST. LAWRENCE CANALIZATION[1]

1. Ocean vessels will not use the St. Lawrence route. It is, of course, obvious that a great tonnage moves between the Great Lakes district and the Atlantic seaboard; and many of the points raised by the proponents of the proposition would very likely prove correct if the St. Lawrence waterway would be used. But it appears to be a fundamental proposition in water transportation that long restricted channels are not utilized by ocean-going vessels to any great extent. Really useful canals like the Suez or Panama are short waterways connecting large

[1] By Chamber of Commerce of the State of New York. Reprint from *Monthly Bulletin.* October, 1920.

bodies of water. Owing to large capital investments and high operating charges, ocean vessels cannot use long restricted channels in direct competition with other means of transportation.

2. The vessels on the Great Lakes handling ore, coal and grain provide the lowest cost transportation in the world. They are, however, especially constructed for the service, with flat bottoms and many special devices. They are quite unseaworthy. Any seaworthy vessel could not compete owing to the necessity for a different construction. The cost of construction of ocean vessels is about three times that of Great Lakes vessels, and the cost of operation is correspondingly greater.

3. The distance from the ocean to Montreal is one thousand miles and about five hundred additional miles would be traversed in reaching the Great Lakes ports. Interest charges on the capital investment and the cost of maintenance of the large crews would necessitate high freight rates, especially as the trip up the St. Lawrence would be very slow.

4. The route would be closed five months of the year by climatic conditions.

5. Export traffic cannot be built up without regular and frequent service extending throughout the year. Export freight goes to a port where such service exists. The exporting manufacturer, for instance, has goods going to various sections of the world, and he ships the goods in bulk to a terminal port, where they are broken up for reshipment by various lines. It would not be possible to make such a port on the Great Lakes. New York will always be such a port with its three hundred and forty miles of developed water front and six hundred and forty-six miles still remaining to be developed. A shipper cannot send his goods profitably to a port with an occasional steamer except under special circumstances.

6. Vessels going through the St. Lawrence to the Great Lakes will be in competition with railroad lines reaching the Atlantic seaboard, with the new barge canal

which will soon be completed with terminals and grain elevators, and with routes going through the gulf ports.

7. The freight movement in the northwest, which normally would go by sea, is all one way, as it is practically all grain and has a very short season. These grain ships would get no return cargoes, and without return cargoes they could not make freight rates low enough to attract the business, even with conditions otherwise favorable.

8. During four or five months of the year vessels utilizing the Great Lakes would either be tied up in the lakes by the ice or would be tied up elsewhere, unless they could find business in new channels. The Great Lakes vessels and canal barges are of such cheap construction an appreciable return on the investment can be made by using them for storage purposes during the winter months. But the large investment of capital necessary in ocean shipping would make this impracticable with ships in operation through the St. Lawrence. Such ships would have to seek new routes several months out of each year. So a lake service would be desultory; and vessels would only go to the lake ports according as chartering conditions would favor such a movement.

9. Even if feasible, the extent to which the waterway would be used, does not justify the expenditure of large sums of money, estimated unofficially at $300,000,000 to $500,000,000. This is particularly so in the present reconstruction period while the people of the United States already are heavily burdened with taxes.

10. The congestion on the railroads has been the result of the war. Not only the railroads, but the ports of the Atlantic seaboard are being brought up to date, and the movement is likely to proceed very rapidly during the next year or so. Even before work on the St. Lawrence could be started, it is very likely the projects now in prospect will have solved our transportation difficulties.

11. Nations always avoid, if possible, having their foreign trade moved through a port located in a foreign country.

12. The Federal government collects 25 per cent of its tax receipts from the state of New York and 48 per cent from the New England states together with New York, Pennsylvania and Maryland, none of whose ports will be benefited by the St. Lawrence improvement. However, if the St. Lawrence improvement would be of great benefit to the country, naturally, these states would be correspondingly benefited.

13. Besides the great expenses of the St. Lawrence project of itself, there will be probably an equal or greater expenditure necessary in order to deepen the harbors and improve the docks and piers at the various Great Lakes ports to accommodate ocean-going vessels.

14. Assuming that the St. Lawrence canal would be used, the rapid changes being made in ocean-going vessels, particularly in the matter of increased draft, means that in a short time, possibly by the time the canal is completed, the depth would have to be increased to thirty-five feet or more. So the waterway may become useless by the time of completion, as it will require many years to build it.

15. The economics of industry and transportation show that it is not practical to build expensive machinery which can only be used a part of the year. As the canal is closed with ice four or five months, this principle would operate against its success. At the present time, the few ocean lines running to Quebec and Montreal have additional terminal facilities at either St. Johns, New Brunswick or Portland, Me., for winter use. In short, the St. Lawrence lines require double the terminal facilities of those lines operating exclusively upon the ocean.

16. In addition to the waste of capital by double ocean terminals, the rail transportation systems must

maintain sufficient facilities to handle the tonnage in winter which would in summer be transported by water through the St. Lawrence. Much idle rail equipment must be kept in reserve to meet the demands of the period when the canal is closed.

17. In the event of the United States being at war with some other country, international law would prohibit England from allowing the United States to use the St. Lawrence channel. It is not permissible for belligerents to ship through neutral territory. The moneys of the United States should be spent in developing waterways which would be available under all circumstances when a war emergency arose, for it is during such emergencies that great transportation congestion develops.

18. The operation of "regular line service" to the Great Lakes would not be possible under any circumstances. Such a service demands a large business organization which would be idle five months of the year; and also a heavy and regular traffic. Both these factors are against a regular line of vessels operating through the St. Lawrence channel. The only class of vessels whose method of operation would permit utilization of the St. Lawrence is tramp steamers. These are vessels that operate without established sailings or schedules and without a large business organization. They are usually chartered for handling bulk commodities such as coal, ore, grain, phosphate, clay, lumber, building material, sugar and certain iron and steel products, all of which move in large cargoes. It is only the traffic common in tramp steamers which could, under the most favorable circumstances, move from the ocean to the Great Lakes. There is not, however, a sufficient quantity of these full cargo shipments to justify the large expense of the St. Lawrence project.

SHOULD WE BUILD THE ST. LAWRENCE WATERWAY?[1]

No

1. *The canal will be much more expensive than is estimated.* It is the opinion of many who have examined into the matter that the $252,000,000 set by the International Joint Commission is far too low, and that the net cost will eventually exceed $1,000,000,000, perhaps even rising to $1,500,000,000. New York pays one-third of all Federal taxes anyhow, but the net result will be that New York and New England will pay for an even larger part, probably, and will benefit little from it, if indeed they do not lose from it. This is inequitable because the west did nothing to pay for the barge canal in New York state.

2. *Buffalo and other eastern cities will be injured.* Investments in grain elevators and harbor improvements will be practically thrown away. Montreal and Portland, Me., also expect to be seriously harmed if the project is put through because their importance as ports will diminish.

3. *Grain exports are declining* and will soon practically cease; we shall consume all we raise. The canal, therefore, is not justified. From 1880 to 1899 our grain exports averaged 31 per cent of the crop but from 1900 to 1914 they averaged only 21 per cent. The war gave them an artificial stimulation but the tendency is downward.

4. *Ocean steamships of large size cannot use the canal* because its depth provides only for vessels drawing less than twenty-five feet of water.

5. *Ship operation depends on speed of turnaround,* and it is a question whether the ship owner could make a profit on transit to Duluth. Although the added dis-

[1] From *Public Affairs.* 3: 30. September, 1924.

tance is not great the time required to go through the locks and the lakes would equal that across the Atlantic. Instead of making a trip from Europe every four weeks they could sail only every eight weeks, and the slow time would interfere markedly with profits. Insurance rates are also high at the time of crop movements because then fogs set in on the St. Lawrence.

6. *The return cargo from Europe does not seem to have been worked out.* Just what would the ships bring from Europe that the middle west needs? Cargoes must be carried two ways for profitable operation.

7. *There is no concentration point,* like New York, for middle western produce. Ships would have to dock at Chicago, Detroit, Toledo and Cleveland, perhaps, to put on a cargo that in New York would be taken on with one stop.

8. *The lakes and the St. Lawrence are only navigable six or seven months in the year,* and ocean steamers cost so much more to build than lake steamers that the traffic would probably not be profitable for them.